RAILROAD GAZETTE

FRIDAY, FEBRUARY 12, 1897.

CONTENTS

ILLUSTRATIONS:	PAGE.
The Roof-Shield in the Boston Subway	108
Bear-Trap Dam, Chicago Drainage Canal	110
Coal-Handling Machinery at Coxe Bros. & Co.'s Docks	111
Bicycle Factory Operated by Small Electric Motors	112
Car Ferry-Boat Pere Marquette	113
Beaudry Champion Power Hammer	113
CONTRIBUTIONS:	
The Moral of the "Deep Waterway"	107
EDITORIALS:	
Taxation of Railroads	114
Electricity for Suburban Traffic	115
Proposed Railroad Legislation	115
EDITORIAL NOTES	114, 116
New Publications	116
Trade Catalogues	116
GENERAL NEWS:	
Locomotive Building	119
Car Building	119
Bridge Building	120
Railroad Law	120
Meetings and Announcements	120
Personal	121
Elections and Appointments	121
Railroad Construction	122
Electric Railroad Construction	122
General Railroad News	123
Electric Railroad News	124
Traffic	124
MISCELLANEOUS:	
Technical	117
The Scrap Heap	118
Railroad Matters in Great Britain	107
The New York & Brooklyn Bridge	107
Tie Plates	109
The Gas Engines at the Gas Exposition	111
St. Louis Railroad Terminals	112
The Ventilation of Passenger Cars	113

Contributions.

The Moral Side of the "Deep Waterway."

TROY, N. Y., Jan. 19, 1897.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Apropos of the report of the Deep Waterway Commission, a question comes to my mind. I have no doubt this question has suggested itself to many minds, but I do not remember to have seen it formulated.

Is it morally right for the state to build such a highway?

Nature has provided certain great waterways, and mankind has utilized these to the utmost seemingly possible limit. With a complete understanding of this provision of nature, and some idea of the extent to which it may be brought into service, many individuals have invested vast sums of money in constructing highways, and providing motive power and vehicles, for the transportation of commodities from place to place, from the port of the producer to the port of the consumer or shipper.

These enterprises have been undertaken with the expectation of receiving a certain minimum amount of business, which in the nature of things must be transported, and cannot be transported conveniently or at all by the natural highways. They have been undertaken in the hope of a certain maximum of business, of which the necessary minimum forms a part, and that all this business shall pay a rate of toll that shall yield a profit on the capital invested.

The traffic that in the natural course of events must exist between points reached by these constructed highways has become in a sense the property of these highways, or individuals or corporate owners. Is it right to destroy it without due compensation, particularly when the enterprises have been sanctioned by the power that now proposes to injure them?

We recognize the right of individuals and corporations to compete for business; but some states have already seen the folly of unnecessary railroad lines competing for business sufficient for but one. They have seen that the result is an ultimate loss to the community as well as to the foolish promoters of the later lines. Is it certain that the gain to the whole country, resulting from the expenditure of vast sums of the people's money in the construction of highways for the cheap transportation of a portion of the country's produce will be greater than the loss to the whole country resulting from the destruction of a large part of the business of existing highways built at private expense?

And even if it is, is it right for the state to do this thing without just compensation to those enterprises which are so fondly called by the multitude "the creatures of the state"?

I have no sympathy with illegitimate practices of railroad corporations, any more than I have with illegitimate practices of telegraph companies, or gas companies, or *individuals*; but in this country we do not take private property for public use without paying for it. Hence I ask, is it morally right for the state to build a deep waterway? WM. G. RAYMOND.

[Our first thought on reading this letter was that there could be no question as to the moral right of the state or the nation to build such a waterway, so far as this one matter of the vested rights of the railroads goes. Those who built the railroads took the risks that their charters might be repealed or amended; that charters to rival lines might be given; that the state itself might build railroads; that the state might improve natural waterways or existing canals. Was there any implied contract that a new waterway should not be built? Furthermore, the vested interests of owners of canal boats, of turnpikes and of river steamboats were not protected when the railroads were chartered. It is true that in Great Britain a new railroad enterprise has always had to demonstrate its public utility before it could get a charter, and this is true now to some degree in certain states of the United States; but even here the state enters not to protect the existing railroad from competition that may serve the public, but to protect the railroad from wanton and speculative "strikes," and the public from wasteful schemes. Such, we say, was our first thought; but in talking of the matter with various men learned in the law or expert in morals, interesting discussions have opened up and therefore we conclude to submit the whole question to the reader.—EDITOR RAILROAD GAZETTE.

Railroad Matters in Great Britain.

Light Railways.—Dec. 31 was the last day for depositing applications to the Light Railway Commissioners for new schemes to be considered during their first session. Railways not in this batch will have to wait now till after the end of next May. In all 28 schemes, representing in the aggregate over 300 miles of proposed line, have been submitted. Eighteen of the new railways are projected for England and Wales and 10 for Scotland. Ireland, which has had light railways of its own for years past, does not come within the scope of the new act at all. Only one of the English and Welsh lines is promoted by an existing railway company, the Basingstoke & Alton line, promoted by the London & South Western. It combines the advantages of serving an isolated agricultural district and occupying a territory which a rival company tried to annex last year. The Commissioners have just announced that they will commence their sittings with an inquiry into this scheme, which is fixed to take place at Basingstoke on Jan. 28.

The remaining 17 companies may be divided into three categories, about half of them being in agricultural districts, while the rest are either, practically speaking, urban or suburban tramways, or intended for tourist traffic round popular summer resorts, such as, for instance, an electric railway along the Ramsgate cliffs.

No less than eight of these lines are not of railway gage. Gages of 2 ft. 6 in., 3 ft., 3 ft. 6 in., and in one case 4 ft.—the usual tramway gage—are proposed. It is difficult to believe that each of these eight cases the arguments in favor of a break of gage are sufficiently strong to overbalance the evident and serious objections. No one, however, as yet knows whether the Commissioners have any views of their own on this point, and if so, whether they will think proper to impress them on the promoters, or whether, on the other hand, they will regard it as a matter on which promoters must be left to judge for themselves.

Of the ten Scotch railways one is a quarry line, one in the suburbs of Edinburgh, the rest are mainly agricultural. All are of normal gage and four are promoted by and at least two others in agreement with existing railway companies.

Newspaper Men's Train.—The earliest trains out of London, leaving the various termini between 5:15 and 5:45 in the morning, have long been known as newspaper trains. But newspaper men's trains—trains, that is, run to take newspaper men after their night's work is over, down from the center of London to their homes in the suburbs—are a newer development. A few years back the London, Chatham & Dover started such a train, leaving the city at 3:15 a. m. for the more distant southern suburbs, balancing it by a train at the same hour in the opposite direction for the special use of Post Office and market employees. From the beginning of the year 1897 the South Western Company runs a similar train, on which workmen's fares will be charged, at 3:45 a. m. from Waterloo to the South Western suburbs.

Accident Reports.—A batch of accident reports, none of them, however, of any great importance, has come to hand in the last few weeks. Among them there are three deserving a word of notice.

A slight collision in Ireland was "due to a cause, which, to the very great credit of railway servants, is so uncommon as to be almost unknown." The driver was apparently half-drunk, the fireman wholly so, and "both men are proved to have twice absented themselves from their engine at Castleblaney, under circumstances which point to their having gone to a public house near the station to get drink."

A slight collision which happened on the South Eastern, in the suburbs of London during a thick fog, was due to the mistake of a signalman. Which, however, of two signalmen concerned made the mistake the inspecting officer is unable to state. Here are his words: "This is not a case where the men concerned can themselves be in any doubt as to what really happened: one or other of them must be telling a willful falsehood; if the fault lay with the signalman at Corbett's Lane he must have made, or caused to be made, false entries in his book, while if it lay with the signalman at Surrey Canal Junction, he must have deliberately omitted to make the proper entries or have prevented his booking boy from doing so. One of the worst features of the case is, I think, that one or other of the booking boys who actually make the entries must have been forced by the signalman to give false evidence, for both the boys support the evidence given by the signalman under whose orders they were working. It is impossible to be certain which of the two signalmen was in fault, and I will not attempt to judge between them, for both the train record books are properly kept, both the men bear good characters, and both of them gave their evidence clearly and without hesitation."

The third accident, also on the South Eastern, is worth a word of notice, partly because it is apparently another instance of a train—or at least in this case two wheels of train—becoming derailed because traffic at full speed has been too soon resumed over a newly reballasted line, but more because it brought to light the fact that the South Eastern Company still employ turned double-headed rails on their main line. "It is, however, satisfactory to learn that it is the intention of the company to adopt for use a bull-headed and heavier rail with heavier chairs, so that in course of time the objectionable practice of turning rails will no longer obtain on this line." W. M. ACWORTH.

LONDON, Jan. 20.

The New York & Brooklyn Bridge.

A meeting of the trustees of the Brooklyn Bridge was held on Tuesday of this week. Mr. William Berri, of Brooklyn, was elected President to fill the unexpired term of the late James Howell. Mr. Berri is a prosperous merchant of Brooklyn. He is active in local politics in a public-spirited and respectable way, and is President of the Union League Club of Brooklyn. At the same meeting Mr. J. Seaver Page resigned the office of Vice-President because of ill-health. He remains, however, a member of the Board of Trustees. Mr. Clarence A. Henriques, a member of the Board, was elected Vice-President to succeed Mr. Page.

At this meeting a report was received from the Board of Engineers on the question of allowing street cars and elevated railroad cars to cross the bridge. The Board consists of Messrs. Virgil G. Bogue, George H. Thomson and Leffert L. Buck, all members of the American Society of Civil Engineers, Mr. Buck being the Chief Engineer of the new East River Bridge. The Board asked for a joint plan from the surface roads for working their cars across the bridge, and such a plan, prepared by Mr. J C. Brackenridge, Chief Engineer of the Brooklyn Heights road, was submitted. It is proposed that these cars shall run west on the north side of the north roadway and east on the south side of the south roadway. A Brooklyn connection will be made with the surface tracks in Sands street. The New York terminal will be an elevated loop, with a radius of 57½ ft. This loop will be at the western end of the terminal structure, and will cross the elevated railroad tracks and the bridge switching tracks over grade, with a head room of not less than 15 ft. The maximum grades required to clear the elevated tracks and the terminal switching tracks would be 5 per cent.

To provide standing room for the trolley cars while loading and unloading and a means for getting to and from them, at the same time leaving the main track clear for car movement, 15 side tracks would be built along the loop just east of the terminal building. There would be standing room for 23 cars on these 15 side tracks. Switches to pass cars into the sidings would be worked from a central interlocked tower. The switches to let the cars out would work automatically.

At the New York end there would 14 stairways by which passenger platforms can be reached from the gallery floor of the main building. These stairways would have a capacity of about 60,000 people inside an hour.

The board recommends that the minimum headway between cars while on the suspended structure should be 102 ft. and the speed not more than 7 miles an hour. Under this regulation the total number of street cars on the bridge and its approaches at one time would be 76 and the total on the suspended structure 46. In the opinion of the Commission this would much increase the capacity for moving passengers, diminish the congestion on the platforms and stairways of the terminals, lessen the demands on the bridge railroad, lessen the use of the stairways at the Brooklyn terminal and would be a valuable auxiliary in case of delay on the present cable road. It is believed that at the maximum 204,300 persons could be carried across the bridge by the surface cars in one direction in one day.

A plan for working the elevated trains over the bridge was submitted by Mr. George B. Cornell and Mr. O. F. Bolston, Chief Engineers respectively of the Brooklyn Union and Kings County roads. It is proposed to connect these roads at Tillary street in Brooklyn, and near this point a connection can be made with the tracks on the bridge. Each elevated car would have a grip to take the bridge cable, and one car on each train would have an electric motor for use at the terminals. This would not increase the capacity of the bridge as the elevated trains would have to be interpolated between the cable trains now running, and the headway could not be much diminished. It is considered probable, however, that such an extension of the Manhattan system would be made as to permit continuous trips of the cars of the New York roads and the Brooklyn roads across the bridge, giving an unbroken journey from the upper west side of New York to the termini of the Brooklyn roads.

It is considered necessary that the cars, both surface

and elevated, while on the bridge should be absolutely under the control of the officers of the bridge railroad.

Inasmuch as it is not proposed to increase the number or weight of trains now running on the cable tracks the change suggested would have no influence on the question of the sufficient strength of the bridge to carry the added traffic.

With regard to the proposed trolley service of street cars across the bridge a question does arise. The cables are capable of carrying the additional load with safety, but the stiffening trusses would, under certain conditions, need to be strengthened. With a fairly uniform distribution the trusses would serve the purpose, but if the distribution were not uniform, or if a procession of cars 102 ft. apart were started with none ahead on the roadway, the conditions would be unfavorable as regards the trusses. The outer tresses are 9 ft. high and the inner ones 17 ft. 3½ in., and under the unfavorable conditions suggested it would be necessary to replace the outer trusses with stiffer ones. But if the distribution proposed is well observed, as it can be, the outer trusses will have ample strength.

It is believed that the operation of trolley cars would facilitate rather than interfere with wagon traffic as there would be space between the cars for light vehicles which can travel at car speed, leaving the inner space free for heavy trucks.

The Roof-Shield in the Boston Subway.

At the time of the recent death of Mr. J. H. Greathead,* we gave a brief historical account of the growth of shield tunneling, from its invention by Brunel in 1818 to the present time. We have now to describe a novel development of this method, which has found its first successful application in this country in the Boston Subway. This is, in a word, cutting the shield in two and using the upper half only, which was made possible and necessary by the conditions existing along the lower and busiest portion of Tremont street, termed Section 6, and lying between Scollay square and the Park street station on the Common, which conditions will be best understood by an account of the events leading to the adoption of the innovation we are about to describe. Although all the rest of the subway has been excavated by the open trenches from the surface or through the streets, where traffic had to be maintained, by covered trenches dug in strips or slices extending the width of the street and about 12 ft. in length for each slice, neither of these methods was found suitable for the section referred to. This is the narrowest portion of Tremont street, being only about 32 ft. between curbs, and as the street is gridironed by pipes and the traffic very dense, the difficulty of constructing a subway placed close to and excavated from the surface would have been considerably increased. It was therefore found advisable to lay it far enouth below the surface to permit tunneling and to avoid disturbing the street pipes.

*See *Railroad Gazette*, Dec. 11, 1896, p. 864.

At the same time the grade on this section is made more uniform, being ⅛ of one per cent. for most of the distance.

The total length of this section is 1,085 ft. The depth of the top of the masonry below the surface of the street, at the beginning of the wide arch near Park street, is 9½ ft.; at Bosworth street, 13½ ft.; at Beacon street, 11¼ ft.; and at the Museum building (near the end of the section), about 6¾ ft. The bottom of the masonry is 21½ ft. lower.

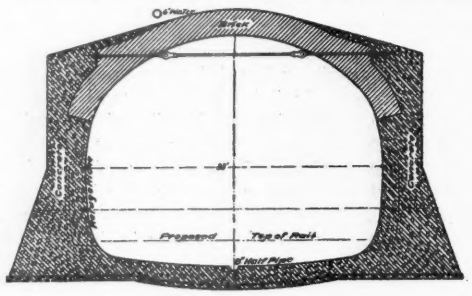


Fig. 4.—Standard Section for "Section 6."

The contract provided that about 24 ft. in length of the north end of the contract section might be done by the "slice" method, the remainder by an acceptable mode of tunneling. It was also suggested that the excavation might be done by means of a roof-shield spanning from one side to the other and pushed forward by jacks reacting against the arch already constructed, if the contractor should find that method practicable. Whatever method was employed, it must excavate little outside of the subway, and admit filling the void space thoroughly and safely. No method would be acceptable which permanently left at any point more than 30 ft. B. M. of timber above 1 sq. yd. of roof. The provisions of the contract were such as to give the public practically the entire use of the roadway and sidewalks during the day, and most of it during the night.

At the request of the contractor he was allowed to construct 48 ft., instead of 24, at the northern end by the slice method. This was done in two slices of 24 ft. each and 24 ft. apart. The contractor then connected these by tunneling as a demonstration of the method he intended to adopt. The method for tunneling the side walls was to drive on each side a small heading about half the height of the side wall, build in this the concrete as far as its height would allow, then drive a second heading immediately over the first to get the full height. Midway between the side walls a center drift about 10 ft. wide and 6 ft. high was driven, with its top somewhat above the proposed top of the arch. In this were placed crownbars, consisting of piles 12 to 14 ft long. The central drift was widened out by driving lagging from these bars at right angles to the direction of the center drift. The bars, roof, earth and traffic above it rested on posts. At the same time a central drift was run south from the southern slice of the contractor to an experimental one which had been excavated by the commission. Two other short sections of tunnel by the crownbar system were started a little later than the one mentioned above. In all these localities slight settlements of the street began after putting in the central drifts and these settlements continued to increase after the drifts were widened.

The settlements on the street were unsightly, but not enough to prevent running of cars. Excavating the drifts for the side walls and other operations had caused the area wall under the curbstone to settle slightly and to show slight cracks where they joined the side walls of the buildings. The contractor was therefore informed that his method was not satisfactory, as it usually, if not always, occasioned settlements in soft ground; and it was decided he should be allowed to complete all the work north of Beacon street by the slice method. This work not proceeding satisfactorily, however, and a small cave-in occurring as a result of faulty bracing, it was arranged that the contractor should cease work and that the rest of section 6 should be completed directly by the commission. It is obvious that in so important a district of the city, where the difficulties arising from the foundations of buildings, the water and gas mains, and the traffic on the street overhead were of a serious character, the utmost care was necessary to avoid accident. The method adopted by the commission was that previously recommended to the contractor.

To this end the roof-shield was devised. An excellent idea of just what this shield is is given by Fig. 1, which shows a small model of one-half of it, looking from the forward or cutting side. The details of the shield itself are given in Fig. 2 and Fig. 2a. It consists of two parallel arched girders riveted at the top to a wide roof plate, under protection of the rear end of which the masonry is laid; the whole weight of the frame and the load supported by it resting through four spherical bearings upon four 10-in. I beams laid in the side walls of the tunnel, which are built up ahead of the shield. These I beams act as runners for the shield to slide on, the sliding pieces being blocks of cast iron containing on the upper side the sockets for the spherical bearings, and the under side being planed and the edges rounded off at front and rear. There are no flanges on these sliding pieces (as of course there must be no side strain on the walls, the shield being guided by varying the pressure on the waterjacks by which it is pushed forward. These latter are ten in number, and placed, alternately with plate braces, between the two girders, abutting against the front girder, which is braced against the pressure of each jack by a gusset on the front side. The jack plungers, 10½ in. in diameter, project through the rear girder and work against the completed masonry, or rather against solid cast-iron cylinders, 2¼ in. in diameter, with collars at the joints, which are left in the brickwork and form a continuous column parallel to the axis of the arch op-

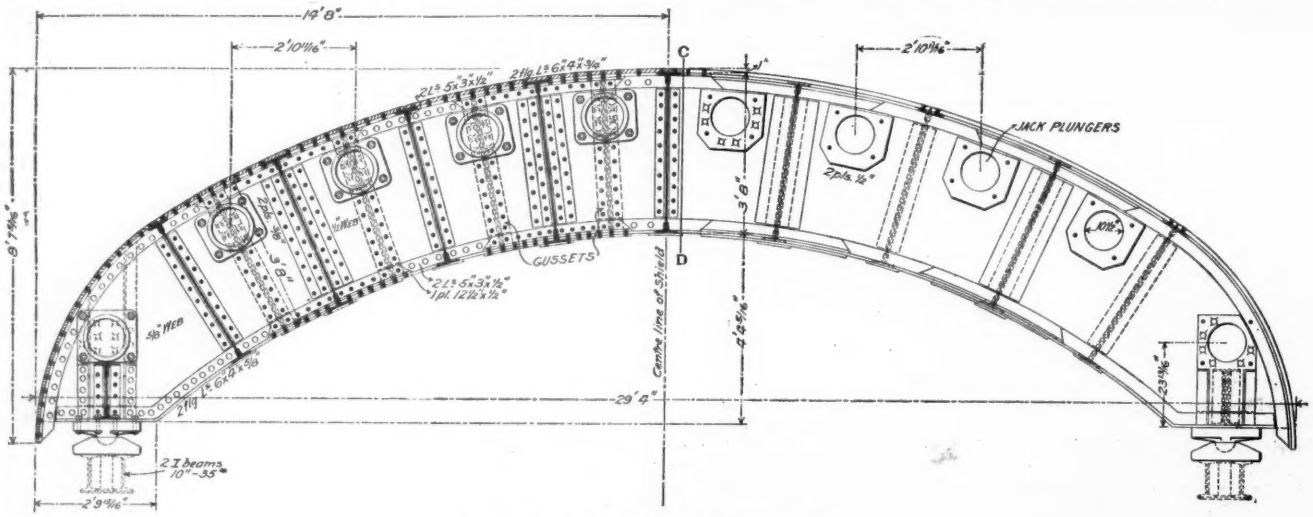


Fig. 2.—Tunnel Shield in the Boston Subway.

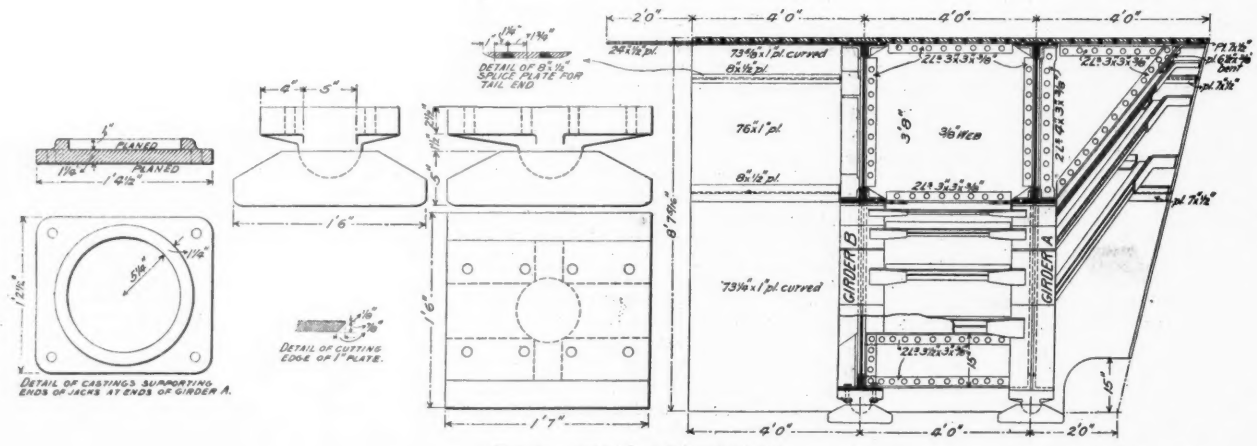


Fig. 2a.—Details of Tunnel Shield.

posite each jack. Water for the jacks is supplied to the shield through a pipe with a flexible joint, by a small steam pump and boiler located at the entrance of the tunnel.

Headings 4 ft. wide and about 13 ft. high are driven on each side of the tunnel for the side walls, which are erected to the height of 12 ft. 2½ in., with the beforementioned I beams mortised in the top. The masonry arch is built up on these side walls behind the shield as close as possible to, and within a foot of, the rear girder of the shield, the cast-iron thrust columns for the jacks being built into the brickwork as above mentioned. The arch is turned on wooden centers. While the masonry is being built a heading about 6 ft. high and the whole width of the tunnel is cleared for about 3 ft. in front of the shield and directly under the cutting edge, the earth roof being temporarily propped up by posts. Care is taken to excavate in no case above the roof of the shield. At the same time the earth below the previous heading (now under the shield) is excavated to a further depth of 5 or 6 ft. This earth is shoveled into trams and taken to the shaft at the entrance to the tunnel, where it is hoisted to the surface, and a conveyor running over the sidewalk takes it to a hopper.

The shield is then ready to be pushed forward, which is done slowly and with care to keep it in proper alignment. Men posted one on each side of the tunnel observe every inch of progress of the shield by scales attached to the same, and compare simultaneous observations. The direction of advance is regulated by the pressure on the water jacks, which are controlled in three groups, a throttling valve for the three jacks nearest to each side wall, and one for the four central jacks. As the shield advances a narrow paring of earth is removed by the cutting edge; this paring is diminished as much as possible by the pickaxe. The post supports are gradually removed as they are reached.

When the shield has been advanced as far as practicable (usually about 3 ft. at a time), it is brought to rest, the jackets retracted, and the excavation and roof construction proceeds as before. After the roof and side walls have been completed, the bottom of the tunnel is further excavated and the masonry invert put in.

This shield has a span of 26 ft. (29 ft. 4-in. over all) and a height of 4 ft. 4 5/16 in. inside. The water pressure now required on the jacks is about 1,000 lbs. per square inch; so that the entire pressure necessary to advance the shield is about 430 tons.

The work is divided into three daily shifts of eight hours each. Each shift usually manages to complete one lap of 3 ft., so that the rate of progress is about 8 ft. to 9 ft. a day. Of the total distance to be tunneled by the use of the shield, about 550 ft., nearly half, has been completed. The method is considered very successful, and the work proceeds with perfect smoothness. The material excavated is largely a stiff, sandy clay, but also sand and gravel. Miners are employed for the excavation.

Fig. 3 shows a photographic view of the shield in the subway, in a position ready to be advanced. The view is from the heading which has been made in front of the shield. Only a small sigment of the shield is shown, in the center of which is seen the controlling mechanism of the water jacks.

The cross-section of the subway shown in Fig. 4 is the standard cross-section for the masonry wide arch construction, Section 6, but has been somewhat modified consequent on the adoption of the shield. The concrete spandrels are omitted, the arch being made entirely of brickwork, with the concrete side wall overlapping on th outside at the ends of the arch. The abutment of the tie-rod is built into the brick, so as to leave the exterior surface perfectly smooth and of the same outline as the shield.

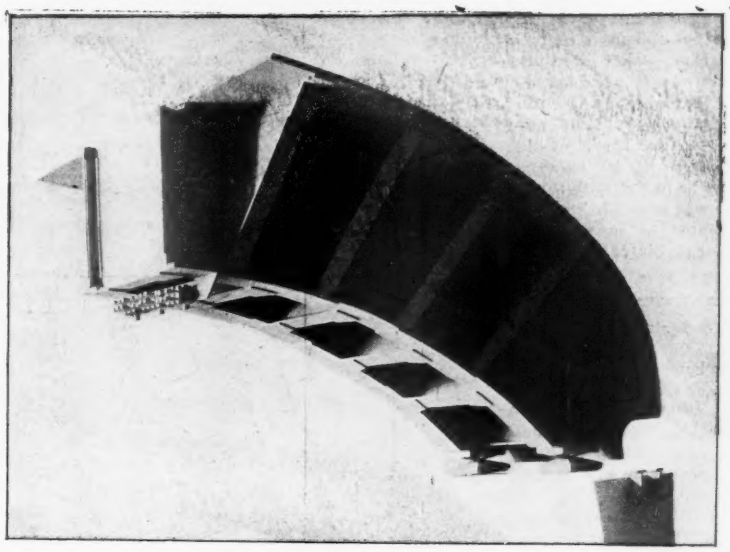


Fig. 1.—Model of Shield, Looking from the Forward or Cutting Side.

The first shield of this character constructed was that tried in 1892 in the York Road tunnel of the Baltimore Belt Railroad, in Baltimore, Md. It was not a success. It had a diameter over all of 30 ft. 8 in. But it appears to have been too lightly constructed, as immediately the weight of the roof came upon it, it began to spread at the sides and settle at the crown, and had to be abandoned. The yielding character of the soil, soft clay and quicksand, which formed the superincumbent weight and the support for the shield, also made working extremely difficult in this case. It is evident that, considering the open front of the shield and the great weight concentrated on the side walls, as well as the necessity of constructing these without the aid of a shield, the method is ill adapted for soft ground.

The only other instance we know of in which a roof-shield has been employed is that of the large outlet sewer constructed during the past year under the Boulevard National in Paris. Here a shield of semi-elliptical outline was used. The width over all was about 21 ft. It was composed, like that in the Boston Subway, of two parallel girders, but was of somewhat more complicated design. Its weight rested on wooden sills laid at the sides of the tunnel and covered with a steel plate. The shield rolled along these on cylindrical iron rollers. It was propelled by six hydraulic jacks placed under, instead of between, the girders, and reacting, not against the masonry, but against steel supports for the masonry centers. The masonry arch itself was not built under the shield, but this was used for placing lagging, which supported the roof behind the shield, and as the shield was advanced was driven up by means of wedges into the space left by its roof-plate, so that there should be absolutely no unfilled space left to cause settling of the roadway. This was rendered necessary by the guarantee under which the work was done, and also by the fact that the top of the masonry was less than 2 ft. (in some places less than 1.31 ft.) below the surface of the roadway. In Boston the space between the brickwork and the roof-plate of the shield was grouted. The water pressure in the Paris shield was 750 to 1,500 lbs., and was generated by a small electric motor attached to the shield and driving a pump. The weight of the Paris shield was about 50 tons. It did not, however, carry a very heavy load, as the traffic was comparatively light, except on the passing of the tramcars. The excavation was in dry sand, which did not require to be excavated in front of the shield, and the total length thus excavated was about 6,200 ft.

The Boston shield was constructed under the direction of Mr. Howard A. Carson, M. Am. Soc. C. E., Chief Engineer to the Commission.

Fig. 3.—Shield Under Tremont Street in a Position Ready to Advance.

Tie Plates.

We find in the report of the proceedings of the last convention of the Roadmasters' Association of America, a report on tie plates and a discussion thereon. As there was some question of the accuracy of some portion of our report made at the time of the convention we summarize again the report and discussion. The following tie plates were furnished to the committee for experiment: The Servis from the Q. & C. Company, the Wolhaupter from the Railroad Supply Co., and the Goldie from Dilworth, Porter & Co. The findings of the committee are:

(a) Tie plates certainly hold the rail to gage.

(b) They prolong the life of softwood ties from wear five or six years, and hardwood ties two to four years.

(c) They are invaluable on curves.

(d) A spike has a better support when used with tie plates than without, as the tie plate gives the spike a required backing.

The committee states that any form of tie plate to be successful must unite itself to the tie, and that plates which fail in this have invariably proved unsuccessful. Tie plates which get loose indent the ties and become themselves broken or bent and cause lamination of the rails. Efforts to overcome this action by using a heavier plate have failed. Heavy plates cause increased wear and spotting of the rail. When tie plates unite with the tie, a much thinner plate can be used.

With regard to the relations of the tie plate to the spike the committee says that it is the duty of the spike to prevent lateral motion, and if the spiking is imperfect this is not done, and to get perfect spiking the tie plate should have the holes punched to allow a close fit; otherwise, the neck of the spike will be cut by the motion of the rail.

The committee has been struck by the fact that many tie plates are furnished with a shoulder, and says that this "shoulder as now used is of little or no value, for when the spike wears the rail gets loose motion and the shoulder and spike are both cut." To the committee it appears that if the shoulder were made the full width of the plate it would offer a support for and reduce the strain on the spike with better results in line and gage.

The consensus of opinion seems to be that the life of cedar ties is 12 to 14 years; hemlock ties five years; tamarack ties six years, and oak ties nine years. The committee finds that better results have been obtained with a narrow than with a wide plate, and considers that 5 in. is ample width.

On the matter of plates and braces the committee unhesitatingly states that the use of tie plates will dispense with the use of rail braces. The committee has received reports showing the successful use of plates on curves of 3 deg. and 30 min.; 4 deg. and 25 min.; 15 deg. and even 60 deg. where they have held the rail in place without any rail braces. No lateral movement or cutting of ties has taken place on these curves, and the track is in perfect and true gage. Finally, the committee says that from reports of service under almost all possible conditions with and without tie plates, it appears that the use of the tie plate is a very necessary appliance. It is economical; it will reduce the cost of repairs to track and to rolling stock. It is a measure of safety, and the committee recommends its general use on all repair and construction work, and feels that the added cost will be more than made up in cost of labor saved in tie renewals alone.

(a) The discussion of this clause sustained the committee and the clause was adopted. The same is true of clauses (b) and (c). The discussion of clause (d) brought in

the question of the shoulder, and here there was some difference of opinion. The discussion was largely by men who said that they had used only a plate with a shoulder, and their opinion was in favor of a shoulder, and a resolution was adopted to the effect that a shoulder should be used extending the entire width of the plate.

The question was then taken up of the use of tie plates or rail braces, and it was voted that the use of tie plates will do away with rail braces. One speaker said that he had used tie plates on 10-deg. curves and had taken off the braces. Before using the tie plate they had braces at every fourth tie and were unable to hold the rail to gage. With the tie plate and without the brace there is no trouble in holding the rail. So far as any expression was had this seemed to be in line with the general experience, and this clause was adopted.

Finally, the Association adopted the general recommendation of the committee that tie plates be used in all construction and repair work.

Bear-Trap Dam—Chicago Drainage Canal.

One of the most difficult problems in connection with the work on the Chicago Drainage Canal was the design of suitable controlling works at the lower end, near Lockport, to provide for the fluctuations in the water surface of Lake Michigan. These variations at the controlling works are from 5 ft. above datum to 8 ft. below, or an extreme oscillation of about 13 ft.

The plan provides for the construction of 15 sluice gates, each with an opening of 30 ft., having a vertical lift of 20 ft. The masonry has been constructed for all 15 gates, but the iron work for seven only is to be erected at this time, this number being deemed sufficient for present needs.

Directly below the sluice gates and on the same side of the channel, a bear-trap dam is now under construction, the crest of which can be raised or lowered, permitting ice and other floating material to pass out of the canal. The general plan of the dam is shown in Figs. 1, 2 and 3. It will be seen that the dam proper consists of two metal leaves hinged at *A*, which work vertically between masonry bulk-heads about the fixed points, *B*, of the down-stream leaf; the rollers on the lower end of the up-stream leaf travel along a metal track built in the masonry.

The up-stream leaf is built up of 41 vertical plate girders, shown in Figs. 1 and 2, 20 ft. 10⅝ in. long, 2 ft. deep at the center for a distance of 4 ft. 6 in. and taper to 1 ft. at either end. A section through the center of one of these girders is shown in Fig. 4. The web is a ⅝-in. mild steel plate, and the lower flange consists of two 3½-in. × 4-in. × ⅜-in. angles riveted to the web. The upper flange is built up of two 3½ in. × 3½-in. × ⅝-in. angles, a ⅝-in. mild steel skin plate covering the entire dam, the joints in which are made on the center line of the girders and covered with a ⅝-in. steel cover strip. The whole is riveted together to form the flange. As shown in Fig. 2, between the girders for horizontal members are 6-in. × 3½-in. × ⅝-in. Z bars, riveted both to the girders and to the skin plate. At the lower end of the up-stream leaf, to provide for the carrying wheels *C*, 10-in. 27-lb. I beams are used instead of the Z bars for horizontal members and three short sections of 10-in. I beams are placed vertically between each pair of girders, to which are fastened the steel castings carrying the wheels *C*. The wheels are cast iron, 24 in. in diameter, with a flat face 5 in. wide, and are mounted in pairs, loosely, on turned steel shafts 3 in. in diameter and 3 ft. 2 in. long. The wheels run on tracks built in the masonry, the running surface being formed by 7½-in. × 1½-in. × 18 ft. 3-in. mild steel plates planed on both sides, and permit an extreme movement of the dam of 17 ft. 1 in. The masonry at either side of the dam is protected by mild steel guard plates.

The whole up-stream leaf forms a rectangular surface exposed to the stream, 160 ft. clear between masonry walls by 25 ft. 10⅝ in. high. The stresses arising from the normal pressure of the water are provided for in the the girder construction described. As the dam is suspended by the attachments at the extreme ends (Fig. 2) to carry the dead weight, the whole up-stream leaf acts as a huge girder with trusses at either end, the vertical girders acting in this regard as stiffeners, the ⅝-in. skin plate as the web, while the flanges are built up of steel plates, making a thickness of 3 1/16 in. at the center of the top flange and 3 7/8 in. at the center of the bottom flange. The up-stream leaf, with pins, rollers, bearings and connections with the down-stream leaf weigh 338,000 lbs.

The down-stream leaf, shown in Fig. 1, is constructed somewhat differently from the up-stream leaf. The main framework is composed of 41 girders, a section of one being given in Fig. 5. These girders have a steel web plate ⅝ in. thick, and the upper and lower flanges are formed by two angles 4 in. × 4 in. × ⅝ in., riveted to the web on either side. The web is stiffened by 3-in. × 3-in. × ⅝-in. angles. The girders are joined by 6-in. × 3½-in. × ⅝-in. Z bars, spaced from 2 ft. to 2 ft. 6 in. apart, and riveted to the web by angles at a distance below the top of the girder of 7¼ in. On top of the Z bars and between the girders is riveted a floor of steel plates ⅝ in. thick, on top of which is a protecting covering of 9-in. × 9-in. timbers.

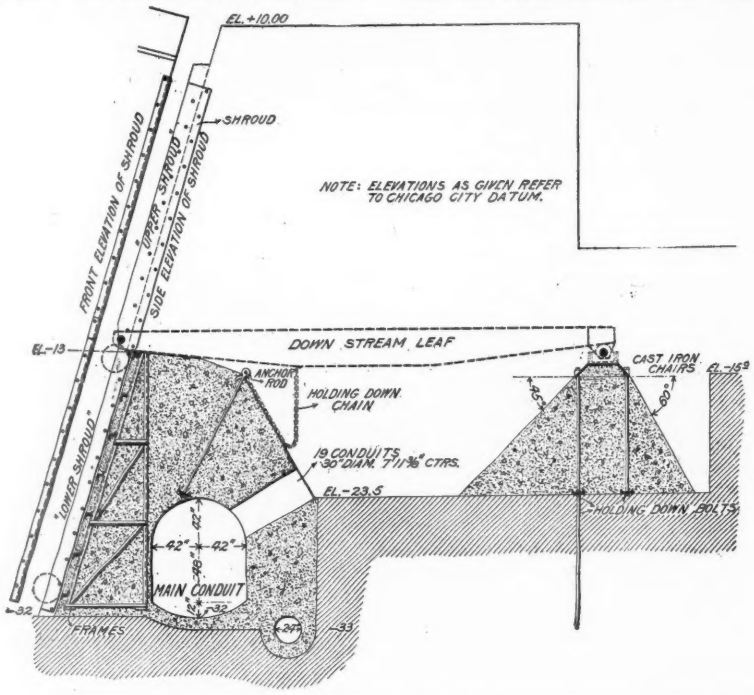


Fig. 6.—Section Through Center of Bear-Trap Dam, Chicago Drainage Canal, Showing Masonry.

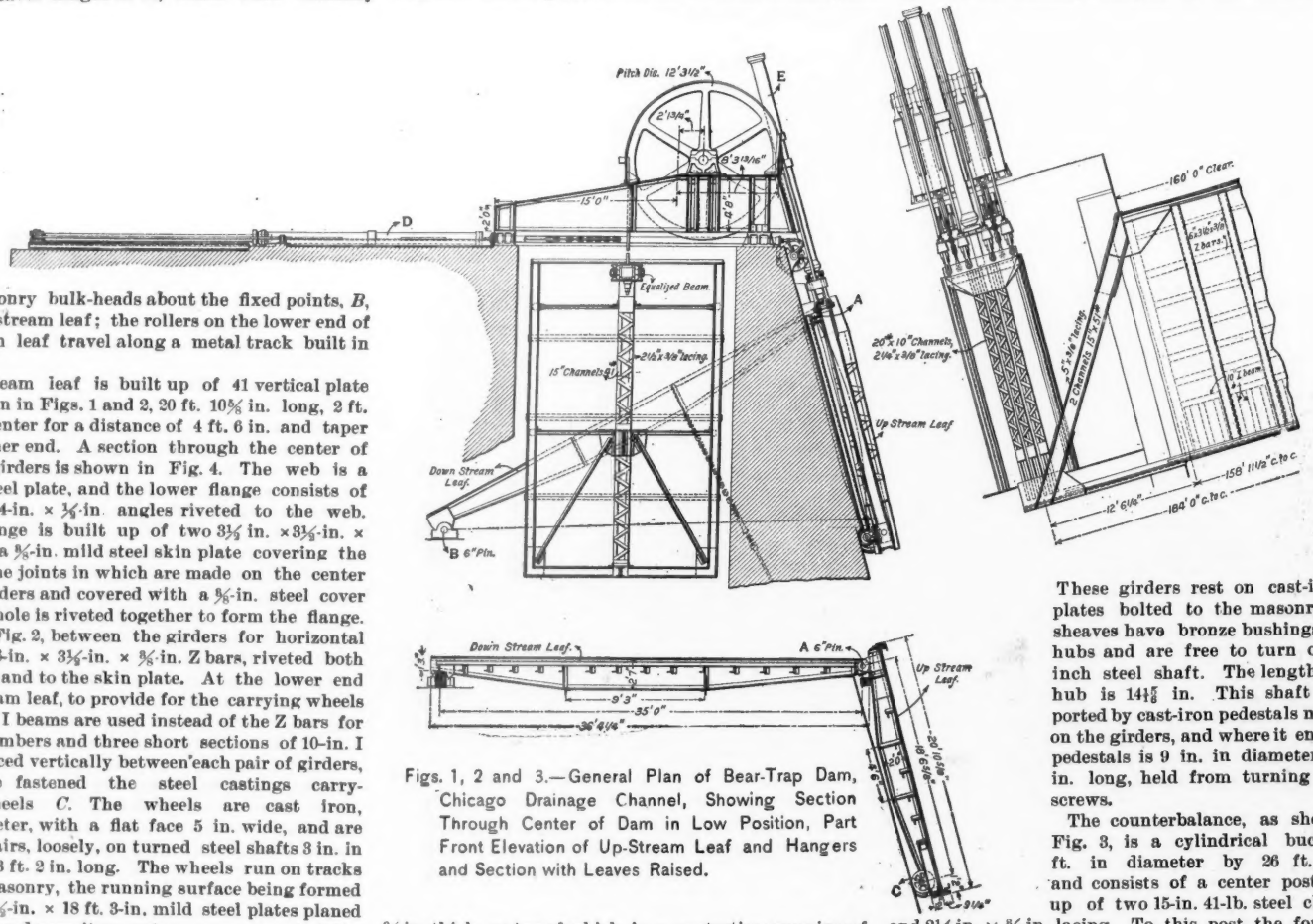
At the upper end of each girder is fastened a steel casting forming a pin joint with the opposite girder of the up-stream leaf, while a similar casting at the lower end makes a pin joint with a steel casting fixed in the masonry. The weight of the down-stream leaf is 505,000 lbs., as follows:

Weight of metal	299,000 lbs.
" " pine timber	143,000 "
" " oak "	43,000 "
" " tar filling (about timber)	18,000 "
" " bolts	2,000 "
Total	505,000 lbs.

As shown in Fig. 2, the dam is suspended at either end of the up-stream leaf by a hanger consisting of three posts each built up of two 10-in. 20-lb. steel channels and 2¼-in. × ⅝-in. lacing. Attached to each hanger are four steel locked wire ropes, 2 in. in diameter, made by the Trenton Iron Company. Also attached to the hangers are two 1½-in. wrought-iron chains and one rigid attachment, which connect the hydraulic rams *D* and *E* (Fig. 3).

The chains are tested for a minimum breaking load of 133,000 lbs., and on a proof test must withstand 66,500 lbs without distortion of the links or injury to the chain in any way.

The wire ropes pass over four cast iron grooved sheaves, 12 ft. 3⅛ in. in diameter, on the pitch line, and are connected to the counterweight bucket. The sheaves are supported by five girders spanning the cylindrical pit in the masonry occupied by the counterbalance.



Figs. 1, 2 and 3.—General Plan of Bear-Trap Dam, Chicago Drainage Channel, Showing Section Through Center of Dam in Low Position, Part Front Elevation of Up-Stream Leaf and Hangers and Section with Leaves Raised.

These girders rest on cast-iron bed plates bolted to the masonry. The sheaves have bronze bushings in the hubs and are free to turn on a 10-inch steel shaft. The length of the hub is 14 13/16 in. This shaft is supported by cast-iron pedestals mounted on the girders, and where it enters the pedestals is 9 in. in diameter and 5 in. long, held from turning by set screws.

The counterbalance, as shown in Fig. 3, is a cylindrical bucket, 16 ft. in diameter by 26 ft. high, and consists of a center post, built up of two 15-in. 41-lb. steel channels and 2½-in. × ⅝-in. lacing. To this post the four wire ropes are attached by means of an equalizer bar. The post is joined to the cylinder proper at the bottom. The cylinder is built up of a framework of 9-in. 18-lb. steel channels, covered with ⅜-in. steel plates on the sides and bottom, and weighs when empty 55,000 lbs. This weight will be increased, by adding water, to 325,000 lbs. for each counter weight.

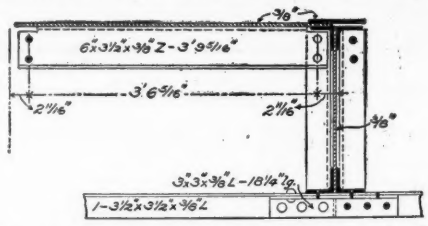


Fig. 4.—Section Through Girder of Up-Stream Leaf of Bear-Trap Dam.

The works for regulating the movement of the dam

consist of suitab.e valves, at either side, by which the amount of water admitted from the up-stream side to the main conduit (Fig. 6) is controlled. This conduit extends the full length of the dam and is provided with 19 openings 2 ft. 6 in. in diameter, connecting with the space under the down-stream leaf. By varying the pressure of the water under this leaf the crest of the dam is raised or lowered. Also, for use in emergency and to act as safety devices the hydraulic cylinders *E* and *D* (Fig. 3) are provided. These cylinders are 7½ in diameter and are fitted with steel plungers which can move through a

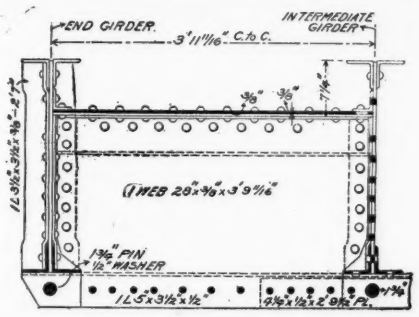


Fig. 5.—Section Through Girder of Down-Stream Leaf, Bear-Trap Dam.

distance of 18 ft. 3⅛ in., using a working pressure of 1,500 lbs per square inch.

The dam and regulating works were designed by Mr. Thomas T. Johnston, Assistant Chief Engineer of the Chicago Sanitary District; the metal details by Mr. Alfred Noble, and Christie & Lowe, of Chicago, are the contractors and do the erecting. The Lassig Bridge & Iron Works, Chicago, furnished the material ready for erection. All steel castings were made by the American Steel Casting Company, Thurlow, Pa., and the iron castings by J. H. Bass, Chicago. The wire ropes were furnished by the Trenton Iron Company, Trenton, N. J., and the chains by S. G. Taylor & Sons, Chicago.

All material entering into the construction and all shop work was inspected by the Pittsburgh Testing Laboratory.

We are indebted to Mr. Johnston for drawings and information concerning this work.

The Gas Engines at the Gas Exposition.

Of the many interesting features of the Gas Exposition, which was closed in Madison Square Garden last Saturday, that of the gas engines which were shown by some of the prominent companies should not be overlooked. It is not our purpose to go extensively into the details of their construction or the theory of their operation, but to simply indicate some of the points which seem of especial interest.

The gas and gasoline engines made by Fairbanks, Morse & Co., of Beloit, Wis., are well known in this country. It was our privilege to receive much information in regard to their construction from the inventor, Mr. J. A. Charter. A 15-H. P. engine was on exhibition, but we were informed that the company made single cylinder engines of 100 H. P. These are doubtless as large as are made in this country, with but one or two exceptions. The engines which are used so successfully at Danbury, Conn., are of the Otto type and are rated at 100 H. P., but in these there are two horizontal cylinders, one above the other, which virtually makes two independent engines. The Fairbank's engine is equipped with a self-starter. A match is placed in the starter, and a knob is pushed in, which lights the match, thereby exploding the mixture which has been pumped into the cylinder. More specifically the process may be described as follows: The detonator is charged and inserted in the fixture attached to cylinder and by operating the pump a charge is forced into the engine cylinder to be fired by the detonator. The expansion of this burning charge has sufficient force to start the engine under about half load without jerk or jar. This starter can be used with either the electric ignitor or the tube ignitor, as the igniting of the starter charge is independent of either of the other ignitors. This allows the starter charge to be fired at the most desirable time, giving the best results in the starting.

Tests on the small engine of this make have shown that a horse-power can be generated from 17 cu. ft. of gas such as is supplied to New York. Proportionately better results can be obtained from larger units. The engines are designed to run at slow speed. The governor is connected with the fly-wheel of the engine and requires no gear or belt. It automatically regulates the supply of gas or gasoline, and at the same time is designed to relieve the engine from compression, which would cause extra loss due to friction. Steady motion is maintained both under full and light loads.

A New Era gas engine of 18 H. P. was belted to a generator which supplied the current for the lights of the tower of the building. The engines can be built for both gas and gasoline, and it is not necessary to even stop them in order to change from one fuel to the other. As figured by the company, the cost to run the engines by gas is reckoned at 15 to 20 cu. ft. per hour per indicated horse-power. Of a specific gravity of gasoline of .74 it requires about $\frac{1}{10}$ of a gallon per indicated horse-power per hour. The consumption cannot be greater than this, and in many cases it is stated to be considerably less. The gas is exploded by either an electric battery or a hot tube, both being furnished with the engine. The tube is simply a piece of gas pipe closed at one end and the other screwed into the cylinder. It entirely encloses a Bunsen burner which furnishes the means to heat the tube. A few minutes' time must be taken in order to heat the tube, after which the engine will start of itself when the gas is admitted into the cylinder and the fly-wheel is given two or three revolutions. Some of the points of excellence which the company claims for this engine are the following: (1) Heavy weight and low speed; (2) all working parts on a side shaft; (3) all movements direct without rods, cranks, eccentrics or intermediate parts; (4) each part adjusted independently of any other part.

A Meitz & Weiss gas engine was also exhibited, and the patent governor, the tube ignitor, and the oiler insures economy of operation. The governors are arranged to operate from the main shaft direct without any belting, gearing or side shaft. The gas and oil engines made by this company have been patented in 1895 and 1896 in the United States and European countries. Besides those mentioned above, a small Vreeland gas engine was in operation and belted to shafting which was used in another exhibit. The "Globe" upright engine, made by the Pennsylvania Iron Works, was exhibited, and the American Motor Co. showed a vapor engine of recent design.

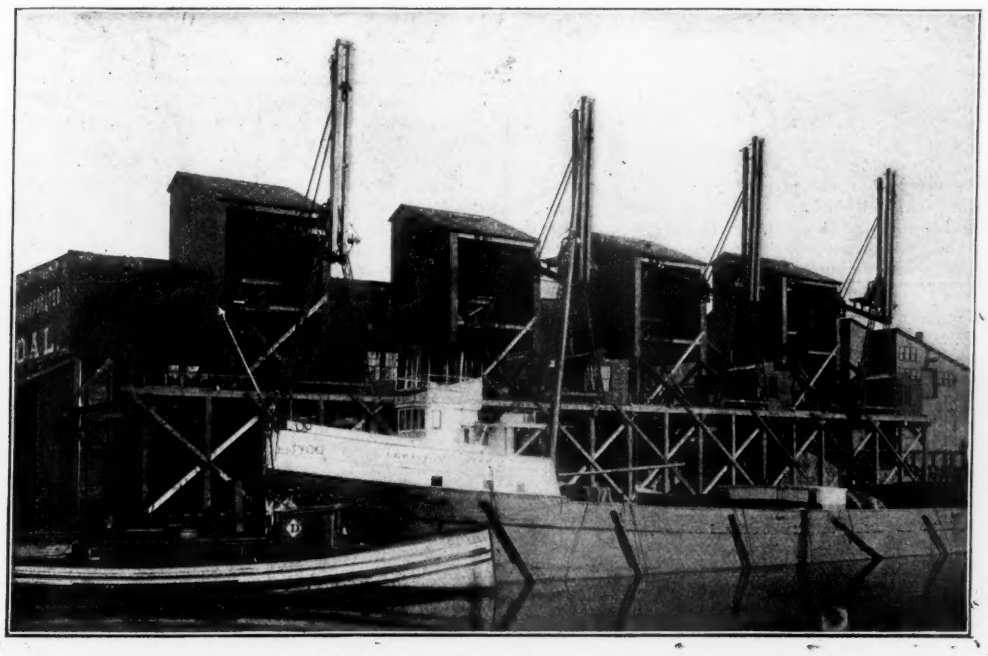


Fig. 1.—The Coal-Handling Hoists at Coxe Bros. & Co.'s Docks, Chicago.

Coal Handling Machinery at Coxe Bros. & Co.'s Docks, Chicago.

The cost of transporting coal by means of the lake vessels has within the last few years been greatly decreased on account of the improved methods and machinery now employed at the Chicago coal docks for unloading vessels and delivering the coal to large storage plants.

The Brown Hoisting & Conveying Machine Company, of Cleveland, O., has recently installed a plant at the Clybourne avenue docks, of Coxe Bros. & Co., on the north branch of the Chicago River, which is the invention and special design of Mr. A. E. Brown, M. E., Vice-President and General Manager of the company.

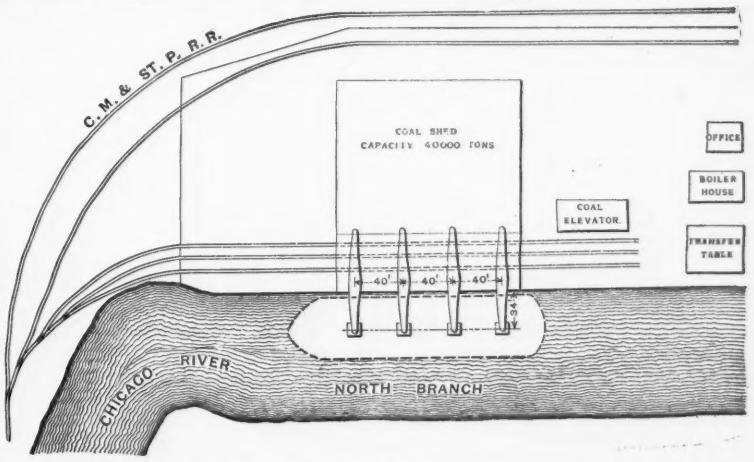


Fig. 2.—Plan of Coxe Bros. & Co.'s Coal Docks, Claybourne Avenue, Chicago.

As shown in Fig. 1, there are four hoists, fitted with cantilever extensions or aprons which can be raised up, as in the illustration, to be out of the way of vessels entering or leaving the dock. The coal is delivered to a large storage building of 40,000 tons capacity, from which it is conveyed to elevators, where it is assorted into different sizes for the trade, only anthracite being handled at this point.

Fig. 2 is a plan of the docks and shows the convenient arrangement of the tracks of the Chicago, Milwaukee & St. Paul.

Fig. 3 is a plan and side and front elevation of one of the hoists, consisting of a shear leg or pier supporting a bridge tramway and cantilever extension on which runs a carriage for carrying the coal buckets.

The pier is built entirely of iron and steel, mounted on rails, and can be moved by hand power a distance of 10½ ft. along the front of the dock either side of its central position, thereby making an adjustment possible so that the machine can be placed in its proper position with reference to the hatches of the boats. These hatches vary in size and distance apart. The extreme end of the cantilever extension or apron, by the same movement, is skewed a distance of 18 ft. on either side of its central position. The machines in their normal positions are 40 ft. center to center, and when so placed cover a distance of 120 ft. By placing the two outside machines at their extreme distance apart, that is skewed 18 ft. from their normal centers, one right and the other left, a total working distance at the end of the aprons over the hatches of 156 ft. is obtained. As the machines, as before stated, can be skewed, right or left, 10½ ft. from their centers, as measured at the front line of the dock, a total dock frontage of 140 ft. is available.

The bridge tramway of each hoist consists of two parallel truss timbers on top of which are steel angle iron upon which the carriage travels. The tramway extends back from the front pier to a hopper a distance of 40 ft. 6 in., inclined at an angle of 5 in. in 12 in., and is supported at its rear end by a special pivoted device directly over the hopper. By this means the front of the hoist can be moved to the right or left without changing the position of the buckets when dumping into the hopper.

The cantilever extension or apron forms a continuation of the tramway from the front pier out over the vessel, a distance of 34 ft. This apon, as before stated, can be rai ed to a vertical position out of the way of the vessel by means of a suitable hand-power crab, fitted with brake and cranks placed in a convenient position on the pier leg.

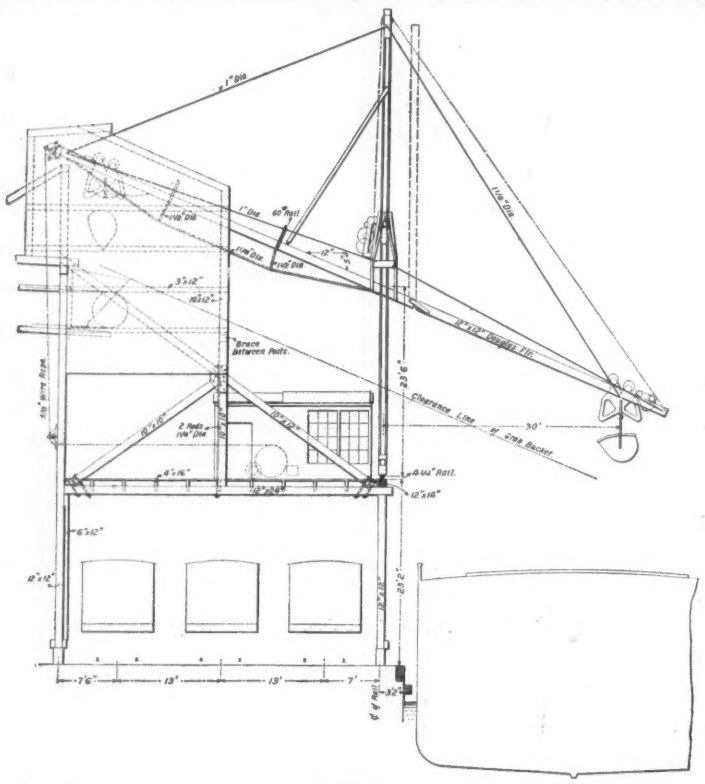
The hoisting and conveying is done by one rope, the mechanism being such that when the bucket is raised from the vessel into the carriage on the apron, the hoist block is automatically locked into the carriage and the same rope conveys the carriage and bucket up the tramway to the hopper. Here stops or dumping irons automatically release the latches on the bucket, which is so balanced that it turns over and dumps the coal, immediately righting itself when empty. The carriage and bucket are returned down the tramway to the vessel by gravity, and a suitable foot brake is provided to govern the descent.

Each machine is operated by a hoisting engine built by the Brown Hoisting & Conveying Machine Company. Each engine is mounted on a cast-iron bed plate together with a friction hoisting drum having sufficient face for the grooves on the drum to take all the rope required for the machine without over-winding. The engines are equipped with a very complete operating gear

and placed in houses at the side of each hoist near the edge of the trestle, so that all operations of the machine are in view of, and controlled by, the operator through suitable levers and brakes.

The following records of work performed by these machines will give some idea of their capacity. These records, however, do not represent the maximum working capacity of the machines, for with all four machines working, and four men to each hatch filling buckets, the men have never yet been able to keep up with the machines. These figures are given in the following table:

Vessel.	Tons of Coal.	Number of hoists worked.	Men to each hatch.	Number of hours.	Tons per hour per hoist.
H. E. Runnels.....	1,232	3	4	8½	48.3
E. Owen.....	2,001	3	4	16½	41.0
M. E. McLaughlin.	2,464	4	4	16	38.3



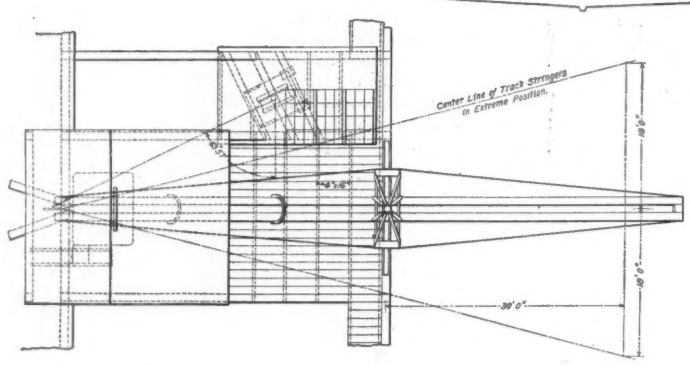


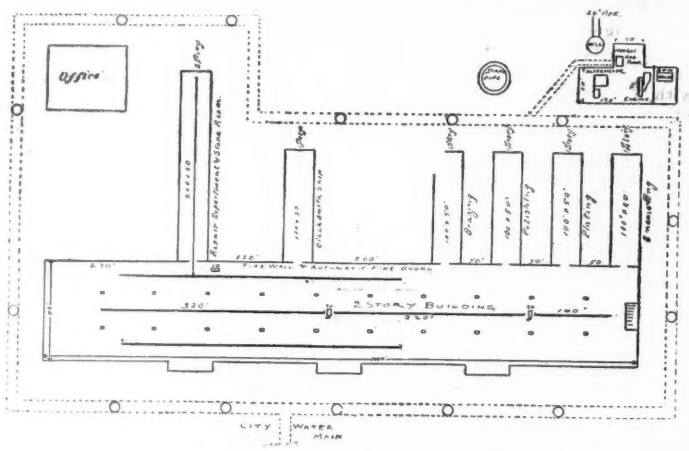
Fig. 3.—Plan, Side and Front Elevation of Coal-Handling Hoist, Coxe Bros. & Co.'s Docks, Chicago.

Bicycle Factory Operated by Small Electric Motors.

The Keating Wheel Co. has nearly completed a factory at Middletown, Conn., which is unique both in its construction and in the application of its motive power. When complete the factory and offices will cover a floor space of 168,250 sq. ft., of which about 150,000 sq. ft. will be devoted entirely to the manufacture of the Keating bicycles. The building is situated on the west bank of the Connecticut River, between the river and the Valley Division of the New York, New Haven & Hartford Railroad. The establishment is divided into three buildings of brick and stone. The main building is 1,000 ft. long, 50 ft. wide and two stories high. Projecting from this on the river side are six L's, each of which is devoted to some special work in the manufacture of the wheels. The main L, 200 ft. long, 50 ft. wide and two stories high, is the repair department and the store-room. As will be seen from the accompanying cut, the others are, respectively, the blacksmith, the brazing, the polishing, the plating and the enameling shops, each of which is about 100 ft. long and about 50 ft. wide. The northeast corner of the plot will be occupied by offices, 100 ft. long by 50 ft. wide and two stories high, entirely separate from the factory.

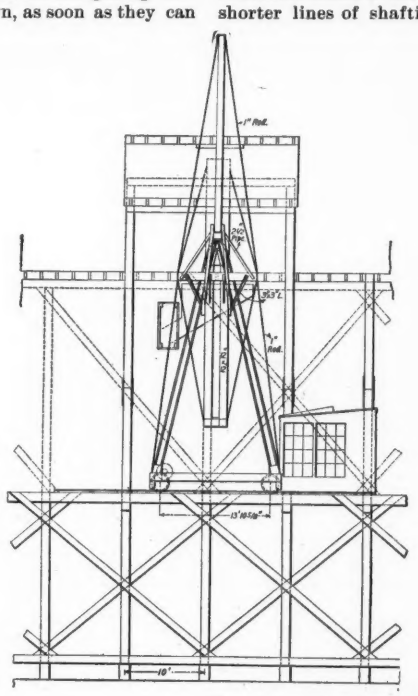
The engine and generating plant is located in the southeast corner of the plot in a two-story brick and stone building. Steam is generated by a Babcock & Wilcox boiler of 250 H. P., separated by a brick partition from the engine-room. The Green cross-compound condensing engine of 500 H. P., is being erected on the second floor upon brick and stone cap piers built up from the ground. On this floor a G. E. three-phase generator known as an A-T 16 pole, 250-KW., 350 revolution, 60-cycle machine, is also placed on piers carried up from the ground. The main belt from the engine passes down to the ground floor, where a countershaft runs in bearings set upon brick and stone piers. The shaft is carried the entire length of the room, and from it will be driven eventually another three-phase machine probably of similar capacity, as well as a set of lighting machines, to be erected at Middletown, as soon as they can be removed from the present factory of the Keating Wheel Co., at Holyoke. This countershaft is arranged with couplings so that any portion may be cut in or out as occasion requires.

The exciter for the generator is a 4½-KW. machine of the I. B. type, run from a pulley on the shaft of the three-phase machine. Facing the generator is a Vermont marble switchboard carrying packed card rheostats, current indicator, volt meter, and the necessary switches for controlling the exciter and the generator. From the switchboard six wires, forming two circuits, issue from one of the windows of the power-house and pass to the main factory, supported on one pole only. They are carried above one of the windows on the second floor of the factory, and there three of the wires terminate, while the other three, which constitute the circuit in service, follow the center of the roof of the second story for about three-fourths of the length of the whole building. At the proper place they are tapped off, descending their respective pillars and passing through the floor of the second story to the motors suspended from the ceiling of the first story.



Plan of Shops of the Keating Factory at Middletown, Conn.

The main building, which is 1,000 ft. in length, is one large room, supported on rows of pine pillars placed 10 ft. apart. The main shafting is about 800 ft. in length and passes along the central aisle, being divided into three sections, between each of which is a 50-H. P., G. E. induction motor of the inverted type. There are other shorter lines of shafting which are about 350 ft. long, one on each side of the main shafting in the north part of the building. Still another line of shafting, about 200 ft. long, runs through the repair department. Two 50-H. P. motors drive the shafting in the main building, while the line of shafting running through the repair shop is driven by a 20-H. P. motor, secured to the ceiling of the first floor in the main building.



All of the motors are supplied with two pulleys on each end so that four independent shafts can be driven from each motor. The entire factory has been laid out by Mr. R. M. Keating, and no pains have been spared in order to make it complete in its equipment and convenient in its arrangement.

A water pipe shown in the diagram surrounds the entire factory and is connected with an 8-in. city water main on one side of the building and with a 1,000-gal. fire pump on the other. Hydrants are placed at intervals along this water pipe for use in case of fire. A fire wall fitted with fire doors which automatically close in case of conflagration is placed between the L's and the main factory. In order that the factory should not be dependent entirely on city water, Mr. Keating has sunk a deep well on the side of the power-house nearest the river, which is supplied by water from the river.

St. Louis Railroad Terminals.

This is the subject of a paper which was read before the St. Louis Railway Club, Jan. 8, by Mr. John J. Baulch, General Freight Agent of the Wiggins Ferry Company. Mr. Baulch is an old railroader and deals with the subject from intimate knowledge. He treats more particularly of the freight department, and reviews the history of St. Louis and vicinity in this line from 1870. The facts given are of the same general character as those in Dr. Taussig's paper on the same subject, reviewed in the *Railroad Gazette* Nov. 30, 1894, though in many particulars he goes more into detail, and the present paper contains facts not given in the other.

Mr. Baulch says that the Cupples station, not far from the old Union passenger station in St. Louis, now handles about 100 cars of merchandise daily, principally package freight. This station, it will be remembered, was established wholly for the benefit of the wholesale merchants, consisting of a series of large seven-story warehouses built with the special purpose of combining stores and freight stations in the same building. The site of the old Union depot is now used for freight delivery tracks. Two Eastern lines now have terminal facilities of their own on the west side of the river. One of these stations, however, is that of the Pennsylvania, which has lately been closed on account, apparently, of a disagreement between the Pennsylvania Company, the owner, and the Vandalia line, the occupant, as to the division of the expenses of maintaining the station. This freight-house and yard cost about one million dollars. The Louisville & Nashville has a freight-house and yard at Cass avenue and Collins street, and has just completed on Broadway, near Cass avenue, a handsome block of 18 ware houses for fruit and vegetable merchants. Mr. Baulch says that during the past 10 years East St. Louis has been raised from a mudhole to a city, with nicely paved streets and modern buildings. Granite City and Madison, at the east end of the Merchants' Bridge, are becoming formidable rivals of East St. Louis.

Replying to the complaints of newspapers and others that terminal charges on freight at St. Louis are too high, the writer says that the rates are, in fact, favorable, in view of the millions of money that the railroads have had to spend to establish their tracks, yards and buildings. In comparison with other cities he regards

St. Louis as highly favored, switching charges to factories and elevators being moderate for the distance and for the service rendered. Moreover, the St. Louis terminals do what no other terminals anywhere do; they are organized into a company by themselves, and the company advances on freight to the amount of millions of dollars each month. On the Terminal Railroad the average earnings per ton are now 30 cents as compared with 47½ cents in 1878. The average earnings *per car* are the same now as then. The average tons per car has increased from 9.4 to 15. The number of cars moved across the Mississippi River in the year 1896 was 426,216. In 1878 the number was 101,596.

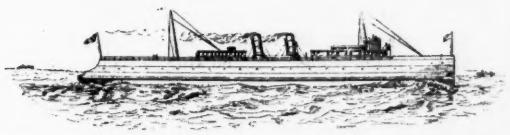
The pamphlet contains a ferry tariff issued by William C. Wiggins in 1842, when foot passengers had to pay 6¼ cents each trip and a two-horse wagon 62½ cents. To-day foot passengers buy monthly tickets, good for 62 rides, for one dollar.

Mr. Baulch says that the St. Louis Car Service Association, organized seven years ago, has revolutionized the methods of loading and unloading, and has saved $150,000 a year for the railroads. The number of switching engines (to do the same work) is 25 less, and the cost of car repairs has been reduced 50 per cent.

Car Ferry-Boat Pere Marquette.

The Flint & Pere Marquette Railroad put in service Feb. 4 the new car ferry-boat Pere Marquette, to operate on Lake Michigan, between Ludington, Mich., the terminus of the road, and Manitowoc, Wis.

The Pere Marquette is a steel twin-screw vessel, 350 ft. long over all by 56 ft. beam, with a molded depth of 19 ft. 6 in. to the main deck, which extends the full length of the vessel; above the spar deck are two substantial deckhouses for the accommodation of passengers and crew. There are four tracks on the main deck, which accommodate 30 full-sized freight cars.



Special consideration has been given to the question of strength in this vessel; the main frames are of steel channels, 12 in. deep, backed up with keelsons and stringers from 4 to 6 ft. apart, and at the load water line is a regular deck stringer with beams every 8 ft., strongly bracketed above and below. The main sheer-strake is doubled as is also the bow plating for a length of 60 ft., and aft the hull is built out to enclose the propellor shafts and dispense with brackets or other fittings that might be liable to injury from ice. The entire construction, including the decks, is of mild steel, carefully inspected and tested to the highest requirements.

The vessel is divided below the main deck into seven compartments by six watertight bulkheads, the extreme forward and aft compartments being further subdivided by a water-tight flat at the level of the water line; so that in the event of any bottom injury, the vessel would remain afloat with any one of the main compartments flooded.

The propelling machinery consists of two sets of compound, vertical, direct-acting, jet condensing engines, each entirely independent of the other, with cylinders 27 in. and 56 in. diameter by 36 in. stroke, capable of developing a maximum of 3,500 I. H. P. and calculated to propel the vessel at a speed of 15 miles per hour. The working parts of the machinery such as shafting and rods, and also the propellers, which are of cast steel of the sectional type, are made unusually heavy.

Steam is supplied by four boilers, built by Wickes Bros, of Saginaw, Mich, of the single ended "Scotch" type, each 15 ft. 3 in. diameter by 12 ft. long and designed for a working pressure of 130 lbs.

The vessel is equipped with a combined hand and steam steering gear, "Providence" steam capstan windlass, stockless anchors housed in hawes pipes; four steam deck warping capstans, steam fire pumps and bilge pumps, two life-boats and a full equipment of lines and anchor chains, also a complete electric light installation including search light. The vessel was designed for winter navigation and every care has been taken to insure that she shall be safe and seaworthy. Robert Logan, of Cleveland, O., who has superintended her construction was the architect.

Beaudry Champion Power Hammer.

The illustration shows the latest improved power hammer built by Beaudry & Co., Boston, which has several new features. Especially to be noted is the manner of imparting to the ram, or head, the force of the blow and securing the necessary elasticity of travel. The ram is a steel casting, with an internal concave track; the two spring arms have rolls which bear on this track. As the hammer shaft revolves the arms lift and throw the ram, which acquires increased travel and force of blow with increased speed of the hammer. At full speed the ram delivers a very powerful blow and returns instantly without reaction or jump. This new design entirely overcomes the use of any form of straps or cushions.

The box pillar frame is very rigid and occupies small floor space. The anvil is an independent casting with an adjustable shoe-die. The shaft and crank-pin run on bronze bushings; the crank is adjustable for varying lengths of stroke. The steel ram runs in heavy guides cast solid with the frame; it will remain at any position of its stroke when stopped. The force of the blow is under perfect control of the operator and may be of any degree from one pound to the full capacity of the hammer, according to the pressure on the foot treadle. Widely varying thicknesses of metal may be worked between the dies without changing the adjustment of the hammer, and succeeding blows may be struck on the edge or the flat of the work. Full length bars can be worked either way of the dies. In the illustration, which is of a 350-lb. hammer, the workman is cutting the end from a 4-in. sq. piece which has been forged by the hammer to the shape shown, in the same heat.

These hammers are built in sizes having heads, or rams, weighing from 30 lbs. to 500 lbs. They are adapted for a great variety of work, varying from very light to heavy forging, axe work, hardware, cutlery, etc. They are also used for drop forging. Beaudry & Co. recently shipped eight of these hammers to one hardware company.

Beaudry Improved Power Hammer.

The Ventilation of Passenger Cars on Railroads.*

There is little doubt but that every one who has spent any time in a passenger car has wondered why railroad officers did not ventilate their cars better. The subject has been studied more or less for the last 10 or 15 years, and many experiments have been made, but thus far no satisfactory system has been developed. Prof. W. Ripley Nichols some years ago analyzed the air in passenger cars on the Boston & Providence Railroad. Also, the speaker analyzed the air from the passenger cars on the Pennsylvania Railroad, some 10 or 15 years ago, the idea being to find out the present condition of the ventilation of the ordinary passenger coach. The results obtained by both these analyses agreed pretty closely, and indicated that the ordinary passenger coach takes into it and out again somewhere from one-eighth to one-tenth as much fresh air per hour as it ought to get. No analyses of the air from Pullman cars have ever been made to the knowledge of the speaker. From time to time since these earlier analyses the subject has been studied, and a couple of years ago nearly the whole winter was spent on the Pennsylvania Railroad in trying to develop a successful system of car ventilation. Notwithstanding these studies, as has already been stated, no successful system is as yet known. The object of this lecture will be to show why.

The first question to be seriously considered is what is the problem we are studying? It is perhaps fair to say that we do not know of any problem so fraught with difficulty, or one which will require more time and patience and careful experimentation than the successful ventilation of passenger coaches. The problem may be briefly stated as follows: The ordinary passenger coach has about 4,000 cu. ft. of space in it, and this space is long, narrow and not high, and it is proposed to take into this space 60 people and keep them in it for four hours at a time, to keep them warm enough for comfort in severe weather, to give them enough fresh air to ventilate the car properly, and at the same time to exclude from it smoke and cinders, and also in the summer time dust. Those who have not made any experiments on the subject will possibly think the problem easy of solution, but to our minds it is the most difficult problem that has ever been committed to the experimental department of the Pennsylvania Railroad.

It may be urged that there is no necessity for ventilation in summer, and that, therefore, the problem comes down simply to providing sufficient fresh air for a few months during the winter. In the summer open the doors and windows. This would be entirely a possibility, provided the wind always blew crosswise of the car thus carrying away the smoke and cinders, but unfortunately this is not the case, and on dusty roads in summer it is well known that opening the doors and windows is out of the question.

Coming down now to a little closer study of the problem, it should be stated, that in our climate it is impossible to separate the ventilating system from the heating system. Cold air taken into a car in sufficient amount to ventilate it is out of the question. It is well known that some cars have no appliances for ventilation, except to let cold air in, but the amount that can thus be taken in is infinitesimal, compared with the amount required for good ventilation. In all our studies the two systems, namely, the heating and the ventilating systems have gone together, and any system or so-called system of ventilation that is not an inherent part of the heating system is, to our minds, a failure before it is tried.

Another question that should be discussed for a moment is, what is the test of good ventilation and how do we know when a car is properly ventilated? It is well known that there is given off from the bodies of all persons, as well as animals, at all times, three things in greater or less amount. These are, carbonic acid, water vapor, and a substance, which for want of a better name, is termed organic matter. Of these three substances one, namely, carbonic acid, is easily measurable. The organic matter has certain peculiarities which are known, but is not definitely measurable. It is believed, however, that this is the material which gives the odor to an ill-ventilated room. In the most recent works on the subject that we have been able to consult, the test for good ventilation is claimed to be that a person coming from fresh air outside, into any space occupied by people shall just begin to detect an odor; that is to say, a room is well ventilated, if when a person comes in from the outside no odor is perceptible, or is just beginning to be perceptible. A large number of experiments have been made which indicate that when the carbonic acid given off by persons or animals in a space, increases over the normal amount by 2 cu. ft. in 10,000 cu. ft. of air, odor just begins to be perceptible, so that this is taken as a measure of good ventilation, namely, when the carbonic acid in any space has increased above the normal amount by 2 cu. ft. in 10,000 of air. It may be added that the air in different parts of the world has been analyzed by different chemists a good many times, and that the average of these analyses show that the normal amount of carbonic acid in the air is about 4 cu. ft. in 10,000. The amount varies somewhat according to location; the air in towns differs somewhat from the air in the country. It is clear, therefore, from what has already been said, that the air in a well-ventilated space should not contain over 6 cu. ft. of carbonic acid in 10,000. But the question now arises, how much air is given off per person per hour. A good many experiments have been made on this point, and it is found that the average of a mixed community gives off about 0.6 cu. ft. of carbonic acid per hour per person.

We are now ready to take another step forward in our study of the problem and ask ourselves the question, how much air is it necessary to take into and out of a car, in order that the amount of carbonic acid given off by the 60 people in it shall not increase the normal amount over 2 cu. ft. in 10,000 of air? A little calculation shows quite an astounding figure, namely, that ignoring the amount of air that is in the car at the start, which is very small comparatively, we are required to take into and out of the car the enormous number of 180,000 cu. ft. of air per hour, in order to dilute the carbonic acid, which is given off by the 60 people in it, to the limit given above. In other words, every person in the car requires, for successful ventilation,

(*Concluded on page* 117.)

* Abstract of a lecture delivered by Dr. Chas. B. Dudley, Chemist of the Pennsylvania Railroad Company, Altoona, Pa., Friday evening, Jan. 22, 1897, at the Franklin Institute, Philadelphia.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Steel Rail Association has gone to pieces; that much we can say positively. As for the immediate cause of its dissolution we prefer not to speak now (Wednesday noon), partly because what we could say would be somewhat conjecture, and partly because such information as we have is largely confidential. The Association price, until within a few days, has been $25 a ton; but it is estimated on good authority that contracts for perhaps 200,000 tons have been let at $20 since the break. It has been apparent for a good while that the Association was laboring under a great strain. Mr. Swank informed us some weeks ago that the output of steel rails for 1896 was probably about 1,100,000 tons. This, of course, is nowhere near the capacity of the mills. As long ago as 1887, they turned out 2,139,640 tons, of steel and iron rails (mostly steel of course). The poverty of the railroads has prevented purchases at prices which seemed unwarranted, considering all other prices and considering the general business situation, and it is believed by many that the mills will actually gain by the great increase of business at the lower price, although there is some danger that unrestrained competition may carry the price below the margin of profit. Naturally, more work for the rail mills means more work in several other industries.

The Joint Traffic Association seems to be undergoing some strain. It is not likely that it will go to pieces, as the Chicago correspondents pretend to imagine, even if all their imaginings about 33 per cent. reductions in rates should prove to be well founded; but the severe competition of the Gulf-of-Mexico routes in export grain has worried the weaker lines pretty badly, and it looks as though some of them had taken advantage of some one of the possible ways of evading the agreement. The guesses that the grain rate (normally 20 cents Chicago to New York), now 15 cents, will be formally reduced to ten cents, seem wild, although it is not impossible that in a dull season, with good weather and no lighterage or other arbitrary to pay, some of the roads might carry grain at that rate and not lose any more money than they would to let their cars and engines stand idle. It seems more probable that the ten-cent rate, so much talked about at Chicago, is to Baltimore, Norfolk or Newport News, where the regular rate is 12 cents. A reduction of 16⅔ per cent., however, is not nearly so spicy a news item as one of 33⅓, hence the reporters' predilection for stating it in the way they do. The most disquieting statement that we have seen is that of the conservative *Evening Post*, of New York, whose Chicago correspondent says that "nearly all the roads" admit that they are carrying grain to the Atlantic seaboard at ten cents. We have not found any one else who believed irregular rates were being offered by more than one or two roads. The Board of Control meets this week, but we go to press too early to report any of its doings. For the presidency of this board, to fill the vacancy occasioned by the death of Mr. Roberts, the gossips mention Mr. Depew and Mr. Ingalls.

The Baltimore & Ohio, one of the roads most loudly accused of making irregular rates, is in a peculiar position. The company entered the association in the same way as the others, the directors voting not to change rates without giving 30 days' notice, except on recommendation of the Board of Managers. The directors are now suspended by the court, and two Receivers are in charge. The Receivers have made no formal acknowledgment of allegiance to the Association, but the representative of the road, now subordinate to them, continues to sit as a member of the Board of Managers. Several weeks ago the Receivers told the newspapers that they were getting all their business legitimately, but that statement was not binding on them two hours afterward, of course. Moreover, the Association agreement does not bind them, in terms, to anything, though it does in honor, unless they withdraw their representative from the Board of Managers. But neither the Baltimore & Ohio Receivers nor the directors of any other road are bound, except in honor, not to own stock in steamship companies, whose agents can manipulate rates on Western grain; nor, probably, does any traffic manager feel bound, except in honor, not to make personal verbal promises to pay heavy "overcharge" vouchers six months hence. And up to about a year ago no one expected a traffic manager to worry much about honor when his need of more business became desperate. Apparently, we have now arrived at a situation where we shall see (or, rather, where those on the inside will see) what strength there is in the 1896 code of railroad ethics, which has been the ground for so many hopeful prognostications. The best ground for confidence in the perpetuity of the Association is found in the fact that all of the roads have enjoyed great benefit from it; not all of the time, but for long periods, and to such an extent that the benefits cannot be forgotten. The expressions to this effect have been so numerous and so unequivocal that their sincerity cannot be doubted. If, therefore, any road has lapsed from the path of rectitude because the Managers have been slow to agree, there is ground for hope that it will soon repent. The fact still remains that orderly competition is better for *all* than disorderly throat-cutting. Suppose Galveston and New Orleans do get a big share of the freight for Europe, what is the use of stabbing your neighbor in the dark?

Taxation of Railroads.

The special New Jersey Tax Commission, appointed by the Governor of that state a year ago, has made its report, and as this report deals especially with taxes on railroad property we have in it a useful compendium of facts, opinions and legal references on the subject, gathered by well-known men of character and experience. (The Commissioners are Hon. John P. Stockton, Attorney-General of the State; Abraham M. Reynolds, James F. Rusling, William H. Vredenburgh and Tax Commissioner Charles C. Black.)

As was said by Commissioner Billings, of Michigan, in his report on this subject, given in the *Railroad Gazette* January 15, almost any method of taxation *can* be made equitable and convenient, and the interminable legislative discussions and strenuous and costly contests in the courts concerning changes in the basis of taxation are not generally due to any defect in principles or difficulty in discovering the best practicable plan of adjusting assessments and rates, but to the persistence of different classes of property owners in opposing changes which they claim, and often believe, to be unfair to them as compared with other classes. These beliefs, so tenaciously fought for are often, of course, well founded, and the financial interests involved are so plain to each contestant that controversies of this kind are as constantly with us as "death and taxes."

The present New Jersey law governing the taxation of railroads was passed in 1884 and revised in 1888. The railroads resisted its enforcement, fighting the law on every possible ground and carrying their cases up to the highest courts, but it was sustained in every particular. Under it a State Board of four assessors values, first the line of a railroad, not exceeding 100 feet wide, and all the passenger stations; second, all other real estate used for railroad purposes; third, tangible personal property, and fourth, franchises. On all of the property included in these four divisions the state collects a tax of one-half of one percent., and it collects in addition to this on "second-class property" (real estate outside right of way) a tax for the taxing district at the local rate, not, however, exceeding one per cent. This local tax in 1895 amounted to $410,882.

The property, on the right of way, is valued at what it cost, so that a deep cut or a heavy embankment is assessed very much higher than a similar length of line in level country, an obviously unfair basis. The bare land is valued according to the value of contiguous real estate, generally being assessed two or three times as much per acre. The value of the franchises has not, of late years, been separated by the assessors from the other values, but the estimated total for the state is from 58 millions to 60 millions. The counsel of the Pennsylvania Railroad, at a hearing before the Special Commission, stated that one-fourth of the whole assessment against the railroads was based upon the alleged value of franchises. In 1895 the total valuation of railroad property was $220,705,822.

The decision of the Commission is, in brief, that the one-half of one per cent. tax collected by the state on railroad property outside the right of way be given to the towns and cities. In 1895 this part of the tax aggregated $205,601. The state should continue to collect the tax but distribute it to the local taxing districts. This would give the towns and cities approximately 1½ per cent. where now they receive only about 1 per cent. One member of the Commission makes a supplementary report recommending that this property outside the right of way ("second class property") be handed over entire to the towns and cities, to be taxed by them at the same rate as other property. The complaint which led to the appointment of this Commission came chiefly from Jersey City and was based on the alleged injustice suffered by that city in consequence of the ownership by the railroads of nearly one-third of all the land in the city (and more than one-third of the productive land, a considerable share of the territory not owned by the railroads being salt marsh or other land of small comparative value).

While the Commission, as above indicated, has offered a very simple solution of the difficulty presented to it, basing its verdict, no doubt, on estimates which, though rough and lacking in scientific precision, may well be substantially just, the report goes at length into the considerations for and against the various methods of taxation. The different parts of the report, however, are not very well co-ordinated.

The ground principle of all taxation is equality to every citizen, and equality here means equality of burden or sacrifice. Each person should make such a contribution toward the expenses of the government that he shall feel neither more nor less inconvenience from his share of the payment than every other person experiences from his. This ideal, as everyone knows, is not carried out. On the great mass of property the rate of taxation is variable from year to year, according to the necessities of the government. Under the New Jersey law the rate on railroad property is uniform year after year. But the taxes paid by the railroads go entirely to the state for the support of the state government (except the 1 per cent. on second-class property), whereas by far the larger share of the taxes paid by other property goes to defray municipal expenditures.

The railroad and other corporation taxes pay substantially all of the expenses of the New Jersey state government. But this is shown to be inequitable, for there are 13 districts in the state in which there is no railroad or canal. These districts, therefore, pay no part of the state tax, and consequently a large city like Jersey City pays more than its share.

The support of the state government by a tax on corporations is, however, based on a principle which seems to be increasingly prevalent, the principle of exempting land from state taxes. This "principle" is, of course, largely empirical, for the line separating municipal expenditures from state expenditures is not rigid or well settled. Local taxes go largely for roads and streets, yet Massachusetts has lately spent large sums for roads out of the state treasury. If land is rightly chargeable with the whole burden of maintaining roads, then the corporations and others who pay the Massachusetts state tax are bearing more than their share. The two millions that the state of Massachusetts has paid toward abolishing grade crossings really represents that much alleviation of the highway burdens of individual towns.

In spite of these Massachusetts exceptions, the principle of making all lands bear their full share of local burdens is well settled. In Pennsylvania, for instance, the railroads pay their taxes, or the great bulk of them, direct to the state for the support of the state government, but in Philadelphia and Pittsburgh, where large tracts of land are used for railroad yards, these lands, by a special clause of the law, are subject to local taxation. The withdrawal of corporation property from the local tax list may easily work injustice. In the city of Washington the exemption of property owned by the national government and by foreign governments (legations) threatened the local administration with financial disaster and Congress had to come to the rescue by assuming a part of the burden of the local expenses.

The Commission deems the tax on the franchises of

railroads and that on their tangible personal property "peculiarly just and appropriate as sources of revenue for the exclusive use of the state." The method of computing the franchise tax is held, however, not to be within the province of the Commission, and no opinion is passed upon the question. The report recognizes the well-known fact that the great mass of real estate and tangible personal property owned by individuals is assessed at much less than its true value, and that intangible property, like money, bonds, mortgages, etc., largely escapes without paying any taxes whatever. The counsel for some of the railroads, in their arguments before the Commission, claimed that someone's estimate of 60 per cent. as the valuation applied by local assessors, was considerably too high; in other words, that the real estate (in Jersey City) is assessed on an average far below 60 per cent. of its true value. This universal governmental weakness or difficulty is discussed by the Commission, but no remedy is offered. In "special reports" submitted by individual members of the Commission it is suggested that a severe law ought to be made to compel local assessors to live up to their oaths, heavy penalties to be inflicted for violation; but we find no definite draft of such a law, and the problem of enforcing a law which the public does not seem to wish to have enforced is not grappled with.

One recommendation in one of the special reports that the entire tax legislation of New Jersey should be revised, is backed up by a statement that the tax laws of the state are now to be found in 823 different sections, filling 181 pages. In the supplementary report by Mr. C. C. Black there is a recommendation that the "second class property" of railroads be taxed at local rates and not at a fixed rate of one-half per cent. Mr. Black says that the present limit of one-half per cent. to be collected by the state and one per cent. by the town or city, was so fixed because 1½ per cent. was, in 1884, deemed a fair average of the local tax rates in the state.

The Governor of New Jersey, in his message to the legislature, commends the commission's report, but is non-committal on the specific recommendation made in it. If the state gives up $205,000 annually to the towns the state expenditures must be reduced or else be partly borne by some other property under some new tax. In relinquishing to the municipalities its share of the tax on property owned by railroads outside of their rights of way, thus giving them the whole of the tax on the property, New Jersey would only be following a rule which has been approved by long experience in other states. The towns and cities in asking this change are only asking their right. Indeed, they could probably bring good logic to support their claim to be allowed to tax the whole railroad property at the same rate as that of private individuals, but in view of the evils nearly always manifested when a railroad has to be mixed up in local political affairs, be the matter at issue never so mild and unimportant, it is a great gain to have a fixed rate for all railroad property. Time was when a single railroad found its property in one town assessed at twenty times as much as other property of substantially the same value in other towns. It is needless to say that such inequality not only worked injustice (perhaps small in any particular case) but tended to promote trickery and all manner of irregularities.

For railroads, the practical aspect of taxation, not only in New Jersey, but in other large states, is that the burden is constantly increasing. Corporations, being the creatures of the state, are subject to the will of their creator, and with legislatures as they are, "will" is often synonymous with whim. In the early days, when all railroads were struggling, and extensions were eagerly desired by many communities in every state, the taxes on railroads were made light. As each railroad more or less completely filled its field and became prosperous, the duty of increasing the tax burden pressed upon the legislatures and, the adaptation of ideal theories to practical conditions being in this matter always difficult, the changing of the basis or the rate often was governed, finally, by expediency. The true theory of the relations between state and railroad being nothing but a puzzle to most legislators, and of no interest to the venal, states have reduced or limited fares at the same time that they have raised taxes.

The adjustment of taxes being so often a question which *appears* to be wholly one of expediency, the element of right and wrong being obscured, the aim of the railroad officer should be to keep fully informed of all the proposed changes, in their incipiency, and to see that as far as possible any agitation of the subject is promptly brought to the notice of the most high-minded and intelligent men among state officials, or in the legislatures or in other bodies having power to act. The Legislature of New Jersey now has before it a conservative report, because the Governor appointed on this commission five conservative men. In view of the fact that in New Jersey, as everywhere else, local assessors exercise the fullest liberty in valuing property far below its market value, no one can say that the commission should have gone farther. Indeed, one of the railroad lawyers reminded the representatives of Jersey City that if the railroad's "second-class" property in that city were taken out of the hands of the state assessors it would at once become the duty of the city assessors to largely reduce its valuation; the city might not get so large a pie to cut as it had been hoping for. One great fact in New Jersey, say the railroads, is that railroad property is assessed at its full value. This being so, any comparison between railroad property and other property is very hard to make, and this helps to account for the reluctance of the Commissioners to make radical recommendations.

Electricity for Surburban Traffic.

At the meeting of the American Society of Civil Engineers held last week, there was presented a paper by Mr. Wallace, Chief Engineer of the Illinois Central, entitled "The Substitution of Electricity for Steam as a Motive Power for Suburban Traffic." It was a statement of the chief results of a very careful study made by Mr. Wallace in 1892 in the course of preparation for handling the World's Fair traffic between Van Buren street, and the Exposition grounds. The paper is not offered as a solution, even approximate, of this difficult problem; but the purpose is to place before the members of the Society the facts as ascertained by that inquiry, with the hope of drawing out discussion, and other papers from experts in this special line of work. This matter of applying electric power to suburban service is again under consideration by the Illinois Central, and Mr. Wallace promises to give further information in a later paper or in the concluding discussion on the present paper.

He divided the problem into the questions of

(1) Practicability, covering the possibility of carrying 10,000, 20,000 or 30,000 passengers an hour; and further, the practicability of handling the suburban business by electric power after the close of the World's Fair.

(2) Economy, the cost of handling the World's Fair business and then the cost of handling the suburban traffic by electricity.

(3) Line construction, power plant, motors and cars.

In order to get the necessary data he prepared and submitted to electric companies a series of 45 questions, and the answers to these questions are embodied in the paper. They are from five companies designated by letters; but in the course of the discussion a guess was made, judging we suppose from internal evidence, that (a)=Westinghouse, (b)=Short, (c)=Edison General Electric, (d)=Thomson & Houston and (e)=Daft or any other one of three or four companies.

The replies to the questions showed a great variation of opinion, but perhaps no greater than was to have been expected when we consider that they were written in the infancy of the art of using electricity in transportation. The problem given was to haul 60 or 70 trains, each consisting of one motor car and two trailers, and carrying 336 passengers. It was assumed that one train could be loaded and dispatched from the terminal station each minute.

The first question was as to the horse-power of the motors. The answers were as below:

(a.) Two of 75 H. P.; 150 H. P.
(b.) Two of 75 H. P.; 150 H. P.
(c.) Four of 50 H. P.; 200 H. P.
(d.) Four of 25 H. P.; 100 H. P.
(e.) 200 H. P.

Question 14.—How much power plant would be required to haul from 60 to 70 trains of 65 to 70 tons each, at 20 miles an hour? The answers to these are:

(a.) 4,800 H. P.
(b.) 10,000 H. P.
(c.) 5,000 H. P.
(d.) 5,000 H. P.
(e.) 12,000 to 15,000.

Question 20.—Give approximate cost of power plant, erected, engines, boilers, generators, separately. The answers are:

(a.) $475,000, not including real estate, which is almost exactly $100 per horse-power.

(b.) $1,000,000, being $60 per horse-power for the steam plant and $40 for the electric plant. This includes the cost of building.

(c.) $320.000, or $65 per horse-power.

(d.) $455,000, or $91 per horse-power, including the cost of building. This is divided, building, $10 per horse-power; dynamos, $35; steam plant, $46.

(e.) $1,169,000 or $77 per horse-power, not including the building.

Question 21.—Give estimated cost for operating power plant with coal at $1 per ton. The answers are:

(a.) $60,000 per year, including fuel, labor and repairs.

(b.) $30 per horse-power, operating 18 hours a day or for 7,500 H. P., a total of $225,000 a year.

(c.) Fuel cost $4 an hour, being 2 lbs. of coal per horse-power per hour; labor account $17 a day.

(e.) $420 a day of 12 hours.

Question 42 is, What will be the percentage of loss of power between the steam engine and the motor? This is estimated by (a) at 33 per cent.; by (b) and (c) at 50 per cent., and by (e) at 15 per cent.

Questions 36 and 37 ask, what time would be required to build and equip the plant, and whether the company would guarantee on its own specifications, at an agreed price, the successful installation and operation of the plant? The companies were willing to undertake to do the work in one year. (a) was willing to guarantee performance; (b) was willing to make a guarantee under heavy penalties; (c) would like a chance to try one train; (d) was willing to make a guarantee; (e) did not answer.

Question 5 was, what is the best method to transmit the power of the motor to the axle, by gear or by crank? To this (a) replied by placing the armature directly on the axle, or by steel gears. (b) was perfectly well satisfied that there was no method admissible but a gearless motor; that is, with the armature on the axle. (c) preferred cranks or parallel rods. (d) and (e) both recommended gears. The light of experience seems to show that the gear men were nearest right; we believe that no gearless motors are now running in railroad service, except on the big electric locomotives of the Baltimore & Ohio tunnel.

The discussion did not stick very close to the question of use of electricity for suburban traffic but rather took up the general question of the substitution of electricity for steam. The ideas brought forward are now pretty familiar to everybody who has studied the subject at all carefully and we shall not attempt at present any abstract of the discussion. Nothing was said to change the opinion which we have frequently expressed, that the cases are very few and peculiar in which economy can be expected in doing by electricity the work which is now actually done by steam. If the traffic can be massed in somewhat large units, it is probable that steam traction will be cheaper in the present state of the art. In almost every instance, then, the question is not one of economy over present methods, but of increasing present gross earnings, or of keeping them. The question which will present itself, is, whether by subdividing the transportation into small units, run very frequently and making frequent stops, the traffic can be held from slipping away to the trolley lines or traffic can be increased enough to pay the interest on the cost of the change and possible increased operating expenses.

With such small specific information as we have, we doubt if even the work of the Manhattan Elevated Railway could be done cheaper by electricity than by steam, regardless of interest on the cost of changing; and yet this is a place where electricity could be used to great advantage, for the load on the power station would be very steady. It was agreed in the discussion that the transportation units on the Manhattan Elevated Railroad cannot be decreased. To do the service required they must be increased rather than decreased; but trains as large as those now hauled on the elevated can perhaps be handled as cheaply with steam locomotives as they can be by electric locomotives, and cheaper if interest is included. It is quite possible that by applying electric motors to more axles and so getting more power and distributing it over more of the structure, an improvement in the present service could be obtained by the quicker acceleration, and of course there are other reasons why electricity would be more satisfactory than steam for the elevated railroads. But we have never seen any demonstration of a saving in working expenses. It is very likely that some of the great electric companies that have studied this subject thoroughly and carefully could quickly show us that an important saving could be made, and we hope that they will do so.

We should not be surprised to learn that Mr. Wallace's second inquiry, the results of which he will soon make public, had developed the fact that it is still inadvisable to equip the Illinois Central suburban tracks for electricity. Trains are now run at intervals of 20 minutes during the hours of light traffic and at intervals of from five to ten minutes during the busy hours in the local suburban service. In the express suburban service trains are run at 20-minute intervals during the day, and with ten minutes headway in the morning and evening. It is probable that the 20-minute intervals for the local traffic could be cut down to intervals of four or five minutes, running single cars or a motor and a trailer, and give the people a kind of accommodation that would materially increase the travel during those hours. It may be that even the five minute intervals of the local service could be sub-divided and smaller trains used; but we should doubt if it would be prudent to reduce this last interval much, with the speed required. It is possible that this local service could be more economically and satisfactorily done with electric cars; but we doubt if the express service could be improved in frequency and speed, and if the cost of it could be reduced, by the use of electric motors. All of this, however, is a random speculation without the facts before us, and we merely make the suggestion, subject to correction, and in the hope of being corrected if we are in error.

Proposed Railroad Legislation.

Propositions for new legislation affecting railroads, in various states, are literally too numerous to mention. As we have already noted, bills proposing to reduce passenger fares, or freight rates, or both, and to regulate express companies, have been presented in many states. It is reported that in the state of Washington 17 bills to regulate railroads have been presented. Bills to establish railroad commissions, or to modify the status of commissions already existing, have also been proposed in many states.

The following bills are reported as already passed by the respective legislatures, though the approval of the Executive has not yet been announced: In Missouri a bill making railroads liable for damages to employees when they are injured by the negligence of a fellow-servant; in Minnesota to make the Railroad Commission elective instead of having the members appointed by the Governor; in South Carolina a law requiring bicycles to be carried free, and one repealing the law forbidding public officers to accept and use passes; in South Dakota a law forbidding public officers to accept passes. In Tennessee a bill of this kind was voted on and rejected by the House of Representatives. The Lower House of the Missouri Legislature has passed a

resolution to investigate the state railroad commission.

Among the bills already reported as killed are: One in Alabama, giving the state railroad commission power to fix rates; one in South Carolina to stop all passenger trains at all stations, another putting telegraph and express companies under the control of the railroad commission, and several others restricting the powers of corporations. It is reported that the Legislature of Iowa will pass no radical measures inimical to railroad interests.

Among the numerous propositions to relax salutory laws already on the statute books is one in New York, proposing to exempt companies in Queens and Suffolk counties from the operation of the law requiring a certificate from the Railroad Commissioners, before a new line can be built.

In Connecticut there is a proposition to make railroads bear the whole of the expense where a change of grades is made at a highway crossing. In Iowa there is a proposition to have the Railroad Commissioners elected by districts instead of being chosen from the state at large. In New Hampshire a bill has been introduced by the Committee on Railroads relating to the issue of bonds and stock by railroad corporations modeled after the Massachusetts statute on that subject. Senator Brackett, of New York, has introduced a bill increasing the number of Railroad Commissioners from three to five, and fixing their salaries at $5,000 a year instead of $8,000. The unfeeling reporters say that this job is simply to get offices for two more patriots. A "fellow-servants bill" has been introduced in Tennessee.

The proposition to require all railroad companies to acquire charters in the state has been brought up in Illinois as well as in North Carolina. In Delaware a bill is introduced called a "free railroad law," being a genaral act under which any organization can proceed to build a railroad under the usual regulations. In Maine there is a bill providing for cumulative voting by railroad stockholders, the object being to give the minority stockholders in the Maine Central a chance to elect one Director.

In New York there is a proposition to prohibit ticket scalping. Judging by the reputation of the New York Legislature the ticket scalpers will not find it very hard to prevent the passage of this bill.

At a conference of the leaders of the principal railroad brotherhoods at Little Rock, Ark., recently a resolution was adopted asking all these brotherhoods to oppose the passage, in all states, of laws tending to reduce railroad earnings.

According to press dispatches sent out from Washington last week, and noticed in our last issue, the bill to repeal the anti-pooling section of the Interstate Commerce law is dead; but as the proposition is likely to come up again in the future it is not out of place to note an argument against the bill which is presented in the statement made by the Interstate Commerce Commissioners in reply to inquiries from the House Committee. This statement of the Commissioners has been given to the public since the Committee was reported to have definitely dropped the bill. It is signed by Mr. Morrison, and in giving the arguments against the bill he includes only those on which the Commissioners are wholly agreed. Mr. Morrison points out that since some of the Commissioners put themselves on record in 1894 as in favor of the Patterson bill the conditions have materially changed. The Supreme Court, in the Social Circle case, has made observations casting doubt upon the authority of the Commission to make rates, and this is one of the reasons why inferior courts have lately decided against the Commission in cases brought before them. Now, the present bill, in explicit terms, gives the Commission authority to prescribe rates, and if it becomes a law, this granting of express authority relating to a *specified class* of rates may be taken as a legislative declaration that such authority does not exist as to other rates. This, of course, might weaken the power of the Commisson. Mr. Morrison's argument is sound, and if the pooling bill is revived the clause here criticised ought to be expunged. In the first place, the power to declare a certain rate unreasonable is of little or no value without the correlative power to declare the *degree* of unreasonableness. In the second place, the clause in the pooling bill giving express authority to regulate rates is useless and mischievous in any event. Mr. Morrison refrains from discussing the general question of legalizing pooling contracts, as "the members of the Commission entertain divergent, if not conflicting, views upon it." The letter also objects to the abolition of the imprisonment clause and calls attention to the fact that under the provisions of the proposed bill shippers and agents may cut rates without committing any legal offense whatever; and a fine of $5,000 against the corporation would, in many cases, be trivial punishment. Finally, the "marked and gratifying decrease in rate cutting" since the decision in the Brown case furnishes a weighty argument against the proposed bill.

An interesting statement with regard to the movement for improved roads in Minnesota was made the other day before the Civil Engineers' Society of St. Paul and will be found in our department of "Meetings and Announcements" under the name of that society. A speaker pointed out the necessity for moving very carefully, for the farmers are not disposed to pay taxes for improved roads. They hold that the chief benefits would come to bicyclists and to engineers. This seems an astonishing state of mind, but that it is a very common one there can be no doubt, and perhaps much the most efficient work that can be done in this way will be in demonstrating to the farmers that they have more interest than anybody else in good roads.

NEW PUBLICATIONS.

A Primer of the Calculus. By E. Sherman Gould, M. Am. Soc. C. E. New York: D. Van Nostrand Co. (Van Nostrand Science Series, No. 112); 91 pages and 16 diagrams. Price, 50 cents.

In this work the infinitesimal calculus is developed as far as the first differentials of algebraic functions of one independent variable and their corresponding integrals. The author's purpose, as outlined in the preface, is to communicate a working knowledge of the science. A few elementary rules are first given, followed by some practical applications. Too much ground is covered, however, to enable the average student to master the subjects treated without the aid of a teacher; and if the book was written with the idea that it would supplant existing text-books, the author will probably be disappointed.

The closing chapter discusses the limitations of the calculus and speaks of the difficulties presented by the conception upon which it is based. The statement in the second paragraph that "the true province of the calculus commences where that of algebra and analytical geometry ends," may be questioned. The *true* province of the calculus is in other fields than that of algebra, which deals with the finite relations, while the calculus has to do with ratios of vanishing functions. A very able mathematician has said: "Algebra is an aid to calculus, while the latter is an aid to analytical geometry. It is hardly true that calculus begins where the others end."

The matter included in the ground covered by the work is well arranged, the language is simple and the book will doubtless aid many who desire to know something about the uses of the calculus, and are willing to devote their energies to acquire this knowledge. It might appeal to a larger class, however, if the treatment had been even more elementary.

Roadmasters' Association of America. Proceedings of the 14th Annual Convention, held at Niagara Falls, September, 1896. Secretary and Treasurer, J. B. Dickson, Chicago & Northwestern Railway, Sterling, Ill.

The report of the Proceedings of the last convention of the Roadmasters' Association, a pamphlet of 144 pages, has just been received. It contains the proceedings, a considerable report of which we published at the time of the convention. In addition is a description of the railroads of Japan, with especial reference to the roadway and track construction, by Mr. C. A. W. Pownall, late Principal Engineer to the Imperial Railways of Japan.

The permanent way for the Japanese railroads was first designed by Dr. W. Pole, Hon. Sec. Inst. C. E., for many years Consulting Engineer in London for the Japanese government. The rails used are almost invariably the flat-footed or T rail, weighing 61½ lbs. per yard. The standard fastenings have been generally 4 wood screws and 16 spikes for a 30-ft. rail on the straight, and 13 screws and 9 spikes on curves. It was found that a good deal of rotting took place in the holes bored for the wood screws. Mr. Pownall, shortly after his arrival in Japan, proposed fang bolts instead of the wood screws. These bolts have a head under the sleeper and a nut and washer over the rail flange. They are ¾ of an inch in diameter, and the heads are 2½ in. square and ⅝ in. thick. The whole weighs about two pounds. The increased life of ties has more than compensated for the additional cost of the fang bolts as compared with screws.

The ties are 7 ft. long, 9 in. wide and 4½ in. thick, the general gage of the roads being 3 ft. 6 in. Mr. Pownall says that now the Japanese would gladly have the normal gage of 4 ft. 8½ in., but the cost of the change would be so great that alteration is impracticable. The ties are laid without any preservative treatment. They are spaced 21 in. centers at joints and 2 ft. 10 in. elsewhere. Ballast is good and abundant.

Practical Hints for Light Railways at Home and Abroad. By F. R. Johnson, M. Inst. C. E., F. R. G. S., late Executive Engineer Assam-Bengal Railway. London: E. & F. N. Spon; New York: Spon & Chamberlain, 1896. 12mo., 31 pages and 6 plates. Price $1.

Mr. Johnson's little monograph has considerably more interest to Englishmen than to Americans, for Great Britain is a good deal stirred up over the subject of light railroads. Nevertheless, it has suggestions that will be of interest to a good many Americans. Mr. Johnson has had experience on a meter-gage railroad in India. He says that if ever light railroads are to be light railroads in the proper sense of the term, and if they are to be a pecuniary success, the idea of adhering to one or the other of the wide gages must be dismissed at once. In saying this he does not except the 3-ft. 6-in. gage in Africa or the meter-gage in India. He says that Ireland would have been more prosperous had she possessed a network of light railroads on the 2-ft. 6-in. gage, instead of the present 5-ft. 3-in. gage, which he says is out of all proportions to her needs, and hangs like a millstone around her neck. In his opinion the only remedy now available in her case would be for the government to purchase all the existing 5-ft. 3-in. railroads, except such as might be advisable as trunk lines, transfer all the rolling stock to the latter, and alter the gage of the former to 2 ft. 6 in. and extend on that gage in the future. It will be observed that he approaches the subject in a very radical way.

The fact is that in speaking of light railroads he is thinking of something entirely different from anything that exists on any important scale anywhere in the world that we know of, except the steam tramways in Northern Italy, which at the end of 1893 aggregated about 1,800 miles.* He is thinking not of what people understand by railroads, either first-class or second-class, but he is thinking of a new method of carrying goods and passengers on existing highways. What he really proposes is to pave the highways with rails instead of macadam, and then use something approximating railroad rolling stock instead of using horses, or traction engines and road wagons. He says that at the present time thousands of tons of goods are brought to railroad stations in carts. What is required is to give facilities which would make it worth while for the farmers and traders to dispense with cartage and at the same time give the investor not less than four per cent. for his money. In other words, he proposes to build a system of farm and mill tramways.

He would make these lines 2 ft. or 2-ft. 6-in. gage, generally not less than 20 miles long at home or 40 miles in the colonies, and he would expect to work them at from 8 to 12 miles an hour. In Great Britain, at least, he would have these light railroads follow the turnpike roads, being placed on one side, close to the hedge or dike. He would expect to use curves as sharp as 200 ft. radius and would expect to buy land only where a right angle must be turned, or in a few cases where the grade exceeds 1 in 30, say 176 ft. per mile, when it might be necessary to leave the highway for a little distance. He would make the formation width 8 to 10 ft., and the cost of earthwork would, he supposes, generally lie between £150 and £300 a mile. He would limit the wheel loads to three tons and would use rails of 35 lbs. to the yard. In most parts of Great Britain the track material could be delivered for £400 per mile or less and laying could be done at £50. He sums up the total cost in Great Britain, including bridging, fencing, station equipment, etc., at $7,500 a mile; or if the highway is not followed he would add $2,500 more for land. Really the estimates are of very little value; they are simply statements of one man's opinion. However, the book is suggestive and it can be read through in half an hour, and perhaps some American may find a chance to absorb such part of a highway as a trolley line has left and promote a scheme for an experimental light tramway.

Sketches in Crude Oil. Some Accidents and Incidents of the Petroleum Development in all parts of the Globe; with portraits and illustrations. By John J. McLauren. Harrisburg, Pa.: Published by the Author. 1896. Pp. 406, large 8vo.

Mr. McLauren does not pretend to have written a learned book of statistics, geology or social philosophy. He has tried simply to tell, in an entertaining way, by anecdotes gathered from many sources and by descriptions of what he saw and knew personally, something of the development of the petroleum industry. A short chapter is given to very ancient history and to an account of the occurrence of petroleum in other lands than ours; but much the most of the book is devoted to the story of oil in the United States. That story is recent, it is wonderful in the rapidity of its development, and it is full of picturesque incident. In 1860 the petroleum exported from New York was 1,300 gals., valued at $850. In 1861 it was 12,700 gals., and the price of refined oil was 61½ cents per gallon. In 1894 the export was 908,281,968 gals, and the price was 5½ cents for refined. Did the world ever see such a development? We suppose not, either in increase of product or in decrease of price. The book contains about 200 portraits and innumerable stories of the fathers of this colossal industry, and we can commend it as a brisk and informing narrative, highly diluted, to be sure, for it was written to entertain as well as to instruct.

TRADE CATALOGUES.

The Chicago Pneumatic Tool Co., Monadnock Block, Chicago, has just issued a handsome catalogue of 36 pages. There are 17 full-page engravings showing the New Boyer pneumatic hammer, Manning sand papering machine, new rotary air drill and Boyer speed recorder, with other pneumatic tools handled by this company. The catalogue also contains 15 engravings of letters received from various railroads and manufacturers who have used these tools and recommend their use.

Electric Heaters.—The H. W. Johns Manufacturing Co. has issued a pamphlet descriptive of electric heaters for street cars, and explaining the general principles of electric heating. Diagrams are given showing the best arrangement for the heaters on the cars, and the different parts of the regulating switch, together with other apparatus, are carefully described. The pamphlet bears the date of January, 1897, and contains sixteen, 4½ × 7-in. pages.

McKee Brake Slack Adjuster.—The Q & C Co., of Chicago, has just issued a small pamphlet describing the McKee brake slack adjuster, the reasons for its use, and manner of operation. The pamphlet discusses at length the various questions arising in connection with the proper maintenance of brakes. The illustrations consist of one engraving from a photograph and four made from line drawings. This pamphlet will be furnished on application.

---

*See article in *Railroad Gazette*, 1895, page 293.

Contractors' Material.—We are in receipt of a new catalogue issued by Willis Shaw, 506 New York Life Building, Chicago, descriptive of the various classes of second-hand material and machinery handled.

The Brown Hoisting & Conveying Machine Company, Cleveland, O., has recently published two catalogues for 1897, one of 75 pages describing the automatic hoisting and conveying appliances, and the other of 90 pages, the various types of cranes. Both contain many handsome engravings, each accompanied by a short description cov ering the principal features of the construction and operation.

Gas Engines.—The New Era Iron Works, of Dayton, O., have issued a small but very attractive catalogue illustrating the different parts of their engines. The pages contain much interesting reading matter, and the comparative figures between the power necessary to drive machinery by gas, steam and electricity will be of interest to manufacturers and engineers.

The Gates Iron Works, of Chicago, have issued catalogue No. 1 (third edition, Jan. 1, 1897) describing and illustrating the Gates rock and ore breakers as manufactured by that company. This 30-page, 6 × 9 in. catalogue contains much useful information to those interested in stone crushers, and the illustrations will aid the reader to appreciate something of the mechanism and appearance of the large castings and machinery. It will be noticed in looking through this catalogue, and comparing it with previous editions, that improvements have been made in their machinery, and the reader will find in some cases radical departures from the old styles. All the changes that have been made are in the line of improvements. This company has made two crushers for the Rocky Hill Stone Storage Co., each of which is 13 ft. high, and weighs over 90,000 lbs., which we illustrated Dec. 27, 1895.

The Ventilation of Passenger Cars on Railroads.

(CONCLUDED FROM PAGE 113.)

3,000 cu. ft. of air per hour. This means, as is readily seen, that we must change the total air in the car 45 times in an hour, or once in about 80 seconds. These figures seem enormous and almost appalling, and it is probable that they will be called in question as being beyond reason. A writer in one of the technical papers recently calls for 60,000 cu. ft. of air per hour per car, or practically 1,000 cu. ft. per person. Furthermore the studies of Dr. Weir Mitchell and Dr. J. S. Billings, published in a recent paper of the Smithsonian Contributions to Knowledge, seem to indicate that possibly less than this amount might be regarded as satisfactory, but the authors are careful not to give any figures, and also say that it would be a mistake to regard their experiments as proving that the commonly accepted figures are wrong. It should be stated that in the experiments made on the Pennsylvania Railroad, no attempts have been made to secure this amount of air. After careful consultation it was decided to content ourselves with one-half the amount stated, namely, 1,500 cu. ft. of air per hour per person, or 90,000 cu. ft. of air per hour per car.

It has already been stated that the heating and ventilating of a car are inseparable, according to our conception of the problem. The question therefore arises, how much heat will be required to heat this amount of air? If we assume that a train contains 12 cars, that all the cars are filled with passengers, and that the temperature outside is zero, we shall find that it will take somewhat about 3 or 4 per cent. of the total heating power of the locomotive to warm the air required for successful ventilation. Whether the locomotive can furnish this amount successfully is a query, but this phase of the case is not yet seriously prominent, owing to the fact that other difficulties have not been surmounted, as will appear later.

The experiments above referred to, which were conducted on the Pennsylvania Railroad a couple of years ago, were founded upon this plan, namely, take air into the car through a hood or scoop situated at each corner of the car on the main deck, carry this air by a wooden box or tube, down into the space below the floor, which is bounded by the floor, the false bottom, the outside sill, and the first intermediate sill. Then take this air up through the floor into the box containing the heating pipes which is situated along the side of the car, just above the floor. In this box the air is brought in contact with the heated pipes and warmed, and from this box it is taken out into the car, the whole length of the car on each side, and finally passed up and out into the open air through ventilators in the upper deck.

The description just given was the state of affairs when the experiment ceased. A large number of experiments led up to this. At first the apertures in the floor leading the air up into the heater boxes, were only ½ in. wide and 4 in. long opposite each seat. With this arrangement we found that when the car was standing still, the direction of the currents was as it should be namely, in through the hood or scoop, down into the space beneath the floor, up over the heating system, and out into the car, and then out through the ventilators in the upper deck, but the amount of air that was taken into the car with these appliances, was only one-fifth or one-sixth as much as was required for successful ventilation. Accordingly these apertures were enlarged, and other modifications made embracing enlargement of every part conveying the air, and increasing the number of ventilators in the upper deck, until the floor had apertures 1¼ in. wide, every 4 in. throughout the whole length of the car. With these appliances it was found fairly easy to get 90,000 cu. ft. of air per hour into the car.

But here the difficulty was struck which has not yet been overcome, namely, although 90,000 cu. ft. of air could be taken into the car and out again per hour, it was impossible in severe weather to warm this air to more than 40 or 50 degs. above the outside temperature. It is well known that the pipes of the heating system are pretty close to the floor, and it is obvious that with the apertures mentioned practically only one-half the heating system was utilized, since the time the air remains in contact with the heating system is small. Accordingly it was proposed to make a slot the whole length of the car through the floor, and thus allow the cold air to directly impinge on the pipes the whole length of the car. This was not done, however, since the floor system is such an important element in the strength of the car, and it was feared that it would weaken the car too much to cut the floor system with a slot through its whole length. It was at this point that the experiments stopped, and it may be fairly said that while it is possible to get one-half the amount of air required per hour to ventilate successfully into a car and out again, it is at present not possible to warm this air sufficient for comfort.

It should be stated that the question of how to exclude smoke, cinders and dust has not yet been studied; also study of the control of the system has not yet been reached. In some of the experiments it was found that when going through a tunnel the air was filled with smoke. It is obvious, therefore, that some means of excluding objectionable material for a short time is essential, in other words, there must be a control of the system. At present experiments are being conducted on how to get the maximum amount of heat out of the heater system. Many interesting points have been developed during the experiments, which it is not necessary to repeat, but which throw sidelight on the problem.

The present condition of the subject of car ventilation can, perhaps, best be summed up by the following statement: If, in very severe weather, we will be content with, say, 20,000 or 30,000 cu. ft. of air per car per hour, and as milder weather comes on increase the amount until in sufficiently mild weather the full amount that the appliances will admit is taken in. This result can be accomplished now, provided, of course, a method for the exclusion of dust, smoke and cinders, and a method for the control of the system, are worked out. On the other hand, it is undoubted that it would hardly be regarded as good policy to spend money in altering cars or putting a system of ventilation upon them until the problem was more nearly worked out than is the case at the present time.

TECHNICAL.

Manufacturing and Business.

The Louis K. Comstock Co., electrical engineer and contractor, Monadnock Block, Chicago, has assigned in favor of the Chicago Title & Trust Co. It is stated that the company is only temporarily involved and will soon resume.

The Link Belt Machinery Co., Chicago, while not overcrowded with work, is running with its regular force full time and reports a gradual improvement in all departments. The company has recently closed contracts as follows: Gilmour & Co., Trenton, Ont, one 750-H. P. rope drive, which includes a 14-ft. fly-wheel sheave weighing 40,000 lbs.; C. T. Roenitz Leather Co., Sheboygan, Wis., 235-H. P. rope drive; Baltimore & Ohio Southwestern Railroad, Zaleski, O., complete coal washing plant, including coal crushers, screens, elevators, conveyors, etc., with a capacity for washing 450 tons a day. The installation of a 600-ton coal-washing plant for the Crabtree mine of the Alexandria Coal Co., Greensburgh, Pa., is now nearing completion.

Willis Shaw, dealer in contractors' machinery, Chicago, has recently received the following orders: Large hoisting engine and steam pumping plant for the McLean County Coal Co., Bloomington, Ill.; steam shovel for W. J. Marson & Co., St. Johnsville, N. Y.; contractors for improvement work on the Erie Canal. Complete equipment of machinery for developing the gold mines, near Villa Rica, Ga., of the Southern States Exploring & Finance Syndicate.

The Erie Scale Truck Co., Erie, Pa., has been chartered for the purpose of manufacturing motors, engines, etc. The officers are: President, H. N. Fleming; Vice-President, C. N. Reed; Secretary, C. A. Butt, and Treasurer, F. W. Bacon, and the capital stock is $25,000.

The Sargent Co., Chicago, reports a much larger business during the month of January than for sometime past, and an increased demand for brakeshoes and steel castings for locomotive parts.

D. G. Morton, formerly Assistant Engineer in charge of construction work on the Southern road and later with the Baltimore & Ohio, and Julian C. Smith, for several years engaged in the construction of street railroads in Baltimore and Washington, have formed the firm of Morton & Smith, with office in the Law Building, Baltimore, Md. They will engage in general engineering and contracting business.

The buildings of the Missouri Frog & Crossing Works, at Centropolis, Mo., which were recently destroyed by fire at a loss of $40,000, will be rebuilt.

Arthur Brock, of Lebanon, Pa., and A. S. Upson and C. W. Scofield, of Cleveland, O., are mentioned as incorporators of the American Nut & Bolt Co., of Newport, Ky., organized to manufacture bolts and nuts. The capital stock is $150,000.

The Drexel malleable journal-box and lid, manufactured by the Drexel Manufacturing Co., Chicago, will be applied to the 100 beef cars now being built by the Wells & French Co. for Armour & Co.

The Norwalk Iron Works, of South Norwalk, Conn., has purchased land, adjoining its present plant, and will enlarge its shops.

Frank A. Wheeler has been appointed Assistant Inspector of steel at the Homestead Steel Works, having passed successfully the competitive examination of the Navy Department. Mr. Wheeler has been connected with the Carbon, Latrobe and Midvale steel companies.

The Baldwin Locomotive Works has awarded to Roydhouse & Arey, Philadelphia, the contract to build a boiler and brass shop, 197 ft. × 150 ft., at Fifteenth and Buttonwood streets, Philadelphia.

The Myersville & Catoctin (electric) road, now being constructed between Myersville and Middletown, Md., is in the market for 550 tons of either new or second-hand rails. Bids are also wanted on one 150 to 200 H. P. engine and a 150 K. W. generator for power-house.

The Firth-Sterling Steel Co., McKeesport, Pa., has begun the erection of two new buildings to replace the treating-house and machine shops recently destroyed by fire.

The two-story brick foundry of the Kepp Gear Wheel & Foundry Co., Allegheny, Pa., was destroyed by fire last week. The loss is estimated between $25,000 and $30,000. The company manufactured gear and motor car wheels.

The Wrought Iron Bridge Co. is suing the York Mfg. Co., of York, Pa., for $22,000, claimed as a balance due for iron and steel furnished for the construction of the defendant's plant at York. The York Mfg. Co. claims that the material in question was not furnished at the time specified in the contract and that they suffered considerable damage by such failure.

J. H. Balderson, Secretary of the Department of Railways and Canals, Ottawa, Ont., advertises a change of place of delivery for the 1,000 tons of 50-lb. steel rails and 3,000 tons of 67-lb. steel rails, for which he will receive tenders until March 2. The former must be delivered, C. I. T., on the wharf of the Prince Edward Island Railroad, Charlottetown, P. E. I., and the other on the wharf of the Intercolonial road at Halifax, N. S., early in the month of July, 1897.

A charter has been granted to the Keystone Gas Engine Co., of New Brighton, Pa., for the purpose of manufacturing gas engines. It is stated that the company will shortly build works.

The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has received contracts for 450 motors for the West End Street Railroad, of Boston, and for five 5,000 H. P. electric generators for the Cataract Construction Co., of Niagara Falls, making eight in all.

The Daniels Steel Tie Co. elected the following directors and officers at the annual meeting held in Youngstown, O., last week: W. Scott Bonnell, W. F. Bonnell, T. Burton, Myron Wood, Z. P. Curry, W. H. McGranaghan, A. J. Wolf, R. E. Daniels, and L. C. Ohl; President, W. Scott Bonnell; Vice-President, T. Burton, and Secretary and Treasurer, W. F. Bonnell.

The Addyston Pipe & Steel Co., of Cincinnati, O., has elected the following Board of Directors: W. P. Anderson, B. S. Cunningham, Henry Hanna, W. A. Proctor, C. D. Kinney, Alex. McDonald, B. F. Haughton, W. Cooper Proctor, and Daniel McLaren. B. S. Cunningham was elected President.

Greenlee Bros. & Co., manufacturers of wood-working machinery, Chicago, state that only part of their main machine shop was destroyed in the fire of Jan. 25 and that they the Corliss engine and boilers, electric lighting plant, Sturtevant heating apparatus as well as many special iron working machines. The blacksmith shop, foundry, warehouse and pattern rooms and drawings and patterns were not damaged. A new engine and boiler have been installed, and the foundry and a new machine shop are now running and the company is prepared to fill all orders with despatch.

The Paterson Iron Co. has been placed in the hands of a Receiver, S. S. Sherwood having been appointed to that position. No statement has been prepared yet, but it is said that the company's liabilities are between $65,000 $80,000, and the assets from $150,000 to $160,000. It is expected to reorganize the company, and increase its working capital.

The contract for the 9-in. girder rails, also for the conductor rail and slot rails for the underground trolley work of the Metropolitan Traction Co., New York City, has been divided between the Pennsylvania Steel Co. and the Wharton Railroad Switch Co. The length of line to be converted is about 43 miles and the rail contract has been equally divided between the two companies. The total order is 12,000 tons.

The General Electric Co., Schenectady, N. Y., has received a contract to furnish the entire electrical equipment for the Worcester & Marlboro Street Railroad to be built between Worcester and Marlboro, Mass. The amount involved is said to be about $50,000.

The Brooks Locomotive Works, Dunkirk, N. Y., is building an addition to its works, for the purpose of providing additional office-room and increasing the capacity of the drawing-room, which has been overtaxed for some time.

The Fairport Elevator Co. has ordered from the Schoen Pressed Steel Co. diamond pressed steel bolsters (both for body and trucks) for the cars now building at the shops of the Missouri Car & Foundry Co., at St. Louis, Mo.

The Penn Bridge Co., of Beaver Falls, Pa., reports having received the award of contract for buildings for the Naval Station at Port Orchard, Puget Sound, Wash. These buildings comprise a storehouse 60 ft. × 120 ft. and two stories high, with steel floor girders for the second story, and a construction and repair shop 67 ft. wide and 325 ft. long with a gallery extending around both sides and ends, with steel floor construction for the same. These buildings are to be erected during the coming spring and summer.

The St. Louis Car Coupler Co., St. Louis, Mo., has filed a petition in the United States Supreme Court for a writ of certiorari in the suit against the Shickle, Harrison & Howard Iron Co. for infringement of patents, and it will be presented to the Court after adjournment on March 1. The Circuit Court of the United States for the Eastern District of Missouri decided in favor of the St. Louis Car Coupler Co., but this was subsequently reversed by the Court of Appeals. This Court has stayed the mandate until March 10, which continues the injunction in force against the Shickle, Harrison & Howard Iron Co. The whole case was discussed editorially in our issue of Dec. 11, 1896.

Iron and Steel.

Furnace C of the Edgar Thomson Steel Works at Braddock, Pa., has been blown out. It is to be relined and have other important repairs made. Furnaces A and I have been again put in blast, and seven out of the nine furnaces in the plant are now producing.

Improvements are being made on the plant of the Firth-Stirling Steel Co. at Demmler, Pa. A new crucible steel plant will be started. Repairs on the testing department of the projectile works, which was damaged by fire some days ago, have been made, and the department is now running again.

The Homestead Steel Works of the Carnegie Co. have started up full in all departments, giving employment to 4,000 men, all of whom have not been employed at one time for several weeks. The various departments have been operating at close intervals.

Buffalo papers state that F. B. Baird, of the Buffalo Furnace Co., is behind a scheme to erect a large steel plant in that city, at a cost of about $1,000,000. It is understood that a large amount of outside capital will be interested.

The nucleus of a fund of $100,000 for a tin plate mill has been started by the Johnstown (Pa.) Board of Trade. Harry Rosensteel, of Johnstown, heads the list with $25,000.

The contract for the new power station to be erected for the New York, New Haven & Hartford, at Berlin, Conn., has been let to the Berlin Iron Bridge Co., of East Berlin, Conn. This building is to be 110 ft. wide by about 200 ft. long, divided into two equal portions, one side to be used for a boiler room and the other for and engine and dynamo room. The latter is provided with a runway and a 35-ton traveling crane. The whole framework is to be of steel, the side columns being enclosed by brick walls.

New Stations and Shops.

The West Shore Railroad is removing its car repairing department from Frankfort, N. Y., to its shops at West Albany.

The Kansas City, Pittsburgh & Gulf will begin work shortly on a new depot at Port Arthur, Tex., which is just north of Sabine Pass. The building will cost about $50,000. The company has also decided to build a new depot at Jensen, a new town 22 miles south of Mena, Ark.

The New York Central & Hudson River has recently completed a new round house at Niagara Falls, N. Y. The new building has 23 stalls, and will facilitate the handling of engines of the New York Central and West Shore roads to an important degree. It cost $22,000.

The Baltimore & Ohio will begin work within a few weeks on its new station at Camden, N. J

New York State Canals.

In his annual report, Mr. Campbell W. Adams, State Engineer and surveyor, recommends that since the $9,000,000 improvement act provides for only 8 ft. of water over the miter sills, aqueducts, culverts and other permanent structures of the Erie Canal, thus allowing the passage of boats of but 1 ft. greater draft than those now in use, and since in nearly all of these structures 9 ft. of water could easily be obtained, such improvement should follow, or be made a part of the $9,000,000 one. He further recommends that some slight changes be made in the present lengthened locks so as to admit of lengthening the present boats from 98 ft. to 115 ft. This would enable the boats to carry a load of 410 tons instead of 300 tons, the maximum contemplated under the improvement.

In regard to the lengthening of those locks which remain to be lengthened, especially on the Erie Canal, the State Engineer says that, the plans for the mechanical lifting lock, which is to replace the series of locks at Cohoes, Little Falls, Newark and Lockport, have been completed. The plans are for a lock which will be operated on the the pneumatic principle. It is expected that contracts for the first installation of such a lock will be awarded during the spring months, and that the same will be ready for operation at the opening of navigation in 1898. The Lockport location has been chosen for this, because of its comparative freedom from obstacles which exist at all the other points where such locks would be desirable. The new locks will have 12 ft. of water over miter sills and accommodate two boats at at a time each 115 ft. long.

The surveys for the entire improvement work are completed, and the plans for the work remaining to be contracted for are so far advanced that it is expected to place the Erie Canal entirely under contract during the coming spring months.

The Birmingham Steel Plant.

The press dispatches say that arrangements have been made by which Birmingham, Ala., will have a steel plant within six months. President Caldwell, of the Birmingham Rolling Mill Co., has made the following statement to Birmingham capitalists:

The present mill plant is amply able to handle steel billets with only slight alteration of the present machinery, having used steel billets from Fort Payne and Henderson steel plant, this city. All that is necessary is converters. Seventy-seven thousand dollars is needed to purchase converters and make the change needed. The Louisville stockholders of the plant are willing to furnish $35,000 and Birmingham will be required to put up $40,000. The rolling mill company proposes to issue six per cent. preferred cumulative stock to cover the sum contributed. Birmingham having raised all but $3,500, and this being assured, a meeting of the stockholders of the Birmingham Rolling Mill Company has been called to meet in this city March 12 for the purpose of issuing the stock.

We have taken measures to get the full particulars of this movement, which we hope to be able to lay before our readers shortly. Of course everybody who knows anything about the situation knows the advantages and the difficulties of producing steel in the Birmingham district. The Birmingham pig is not fit for Bessemer steel, but the only reason why it should not be used for open-hearth steel is, we suppose, the uncertainty of a market for the product.

Exports of Southern Pig Iron.

Mr. James Bowron, Treasurer of the Tennessee Coal, Iron & Railway Company, Birmingham, Ala., has written a long letter to *Bradstreet's* concerning exports of pig iron from the Birmingham district. He says that Alabama iron is now being shipped to England, Holland, Belgium, Germany, Spain, Italy, Austria, India and Japan, with business pending for Russia, Australia and South Africa. The aggregate export sales of Alabama iron from July 1, 1896, to Feb. 1, 1897, are more than 92,000 tons. These sales have been made in an increasing ratio and will require three or four months from the present time to complete them. Shipments within the past week to foreign countries have been greater than all shipments combined prior to Oct. 31. The foreign sales of the largest producers in the district in December 1896, and January, 1897, were larger than their sales for domestic consumption.

Tonnage Rating on the Erie.

The Erie Railroad has recently built at the company's shops at Susquehanna, a dynamometer car which is practically a duplicate of the car designed and built some years ago (about 1878 or 1880) for the Pennsylvania Railroad, and also nearly identical with one owned by the Chicago, Burlington & Quincy. It records the drawbar pull on a roll of paper which takes motion from a truck axle. We are advised that the car is to be used to check up the tonnage rating for the various classes of engines on the different divisions. No elaborate experiments for determining train resistance are contemplated.

THE SCRAP HEAP.

Notes.

The shops of the Louisville, Evansville & St. Louis at Princeton, Ind., were burned on Feb. 8. Loss, $75,000.

A Boston paper states that the cost of clearing the snow from the tracks of the West End Street Railroad, after the storm of two weeks ago, was $50,000.

The legal department of the Pennsylvania lines has given an opinion that tickets after they are six years old should not be accepted, and instructions to this effect have been given to conductors.

Press dispatches state that the city of Victoria, B. C., has been relieved by the courts from all liability for damages in connection with the bridge disaster in that city in May, 1896, when a street car fell into the river and 56 lives were lost.

The Toledo *Blade* reports that a company has been formed to run car floats between that city and Detroit, and that one barge has already been ordered built at Wyandotte, Mich. The name of the concern is the Michigan & Ohio Transportation Company, and its capital $200,000. Each vessel is to be 340 ft. long over all and will carry 28 cars.

On the night of Feb. 8 a passenger train of the Atchison, Topeka & Santa Fe was stopped by two robbers 60 miles east of Kingman, Ariz., and the express and mail cars detached from the rest of the train. The express messenger killed one of the robbers at once, but the other one compelled the fireman to run the cars some distance ahead and succeeded in getting a few registered packages from the mail car. The mail clerk says that there were several robbers.

The Railroad Commissioners of New York have again had their Grade Crossing bill presented to the legislature, although the recommendations of the Board on this subject have fallen upon deaf ears for several years. The bill is the same as that which was drafted a year ago, except in one particular. It provides that the state shall pay 25 per cent. of the cost of separating the grades at street crossings of railroads, leaving 50 per cent. for the railroad company to pay and 25 per cent. for the towns; the change made this year is that where a street railroad occupies the street it shall pay a portion of the 25 per cent. assessed against the town or city, the amount of this portion to be determined by the Railroad Commissioners. The State is not to pay over $100,000 a year on account of grade-crossing improvements.

The Tiger River Train Accident.

On Jan. 25 a freight train broke through the bridge over the Tiger River on the Charleston & Western Carolina Railroad, near Spartanburg, S. C., and 12 empty cars fell into the stream. The engine and forward portion of the the train went over in safety and the trainmen all ascaped, though two tramps were killed. An officer of the road writes us that there is no evidence of any defect in the bridge and that it is believed that a car must have been derailed by the failure of a drawbar or of a car body. The bridge, which was of medium steel, was made by the Passaic Rolling Mills, Paterson, N. J., and erected by Grant Wilkins, of Atlanta. It was about two years old. The plans and the material were inspected by G. W. G. Ferris & Co. The bridge was 610 ft. long and 80 ft. high at the highest point. There was one 100-ft. span, five 60-ft. spans and seven 30-ft. spans. The bridge was designed to carry a 90-ton engine followed by a load of 3,500 lbs. per lineal foot. The final inspection was made by Mr. Bellingrodt, Chief Engineer of the Bridge Department of the Lombard Iron Works, Augusta, Ga.

The Y. M. C. A. and the Railroads.

The Railroad Department of the Young Men's Christian Association gave a dinner, Feb. 5, at the Auditorium Hotel, Chicago, for the officers of the principal railroads, 47 being present. The object of the meeting was the promotion of the work of the Y. M. C. A. among railroad men. The various speakers described what progress had already been made and the plans for the future. The Chicago & Northwestern intends to erect a Y. M. C. A. building, costing $20,000, at West Fortieth and Kinzie streets, Chicago, the funds for which were partly raised by the employees, the balance being contributed by the company. Among those present at the dinner were many of the most important officers and directors of the railroads centering in Chicago.

The Lake Dredgers' Association.

A meeting of 123 owners of dredges on the Great Lakes, representing a capital of $5,000,000, was held in Chicago on Feb. 6, and an association to be known as the Lake Dredgers' Association was formed. Officers were elected as follows: President, E. J. Hingston, Buffalo; Vice-President, C. A. Barker, Duluth. Executive Committee—J. H. Breyman, Toledo; S. J. Cram, Detroit, Harvey Hubbard, Sault Ste. Marie; E. J. Hingston, Buffalo; C. S. Barker, Duluth, and Thomas Hickler, Sault Ste. Marie. The objects of the association are to prepare information concerning prospective contracts and give out information among members as long before the commencement of such work as possible, so as to facilitate the procuring of bidders' bonds at reasonable expense; to secure the most advantageous form of insurance and reasonable rates of premium thereon. Each member of the association is to pay to the treasurer 5 per cent. of the gross income of his plant. On the 20th of each month the treasurer is to distribute among the members, pro rata, all accrued funds in excess of $5,000. It is stated that it is not the object of the association to raise prices or to stifle competition, but it has been admitted that prices might be raised about 5 per cent.

Twenty-fifth Anniversary of the Stevens Institute of Technology.

Plans have been perfected for the celebration of the 25th anniversary of the Stevens Institute of Technology on Thursday and Friday, Feb. 18 and 19. President Morton has succeeded in securing the following speakers for the dinner to be held at the Waldorf on Thursday evening of next week: Bishop Potter, Andrew Carnegie, Governor Griggs, of New Jersey; President Seth Low and Prof. Charles F. Chandler, of Columbia; Vice-President-elect Garret A. Hobart, Mayor Strong, Ex-Mayor Hewitt, Commodore Melville, U. S. N., Prof. James E. Denton and Mayor Fagan, of Hoboken.

The most interesting and attractive feature in the celebration will probably be the exhibition of the work of the faculty and alumni. This will be opened to the public at the Institute in Hoboken, N. J., on Friday from 10 a. m. to 5 p. m. This exhibition will consist principally of machinery, specimens, models, photographs and drawings which represent the work of the graduates and testify to the prominent part they have taken in the development of engineering science. A few of the more prominent exhibits will be as follows: Prof. W. H. Bristol, recording instruments for pressure, temperature and electricity; F. E. Jackson, X-ray apparatus; J. T. Kelly, induction electric generator; E. A. Uehling, pneumatic pyrometer blast furnaces. Mr. Joseph Wetzler as a member of the Press Committee calls attention to the needs of the Institute in the following words:

"The present occasion seems a fit one to call attention to the needs of the Stevens Institute of Technology, whose work has year by year outrun its facilities. The founder of the Institute, Edwin A. Stevens, Esq., originally bequeathed a plot of ground and $150,000 for the erection of a building "suitable for an institution of learning," together with $500,000 as an endowment fund. From this amount the United States Government in 1870 took about $45,000 as a collateral inheritance tax. As the courses of the Institute were broadened, increased funds were required for equipment, but as these were not available from the income of the endowment fund, the worthy President of the Institute, Dr. Henry Morton, has in the past generously provided the increased facilities placed at the disposal of students, out of his private funds, and we learn that in connection with the coming anniversary he has already transferred to the Trustees of the Institute 1,000 shares of the stock of the Texas Pacific Railroad, to be held by them until, by reason of its increased value and other donations for the same object, a fund will be made up adequate to the erection and maintenance of a much-needed new building, for which a considerable amount has been already raised by the Alumni Association."

Rapid Transit in New York.

The Rapid Transit Commission last week took final action on the proposed underground route with its southern terminus at the City Hall. Chief Engineer Parsons presented complete drawings and plans illustrative of the route and explained the plans of construction of the underground line as adopted by the Board Jan. 14. The Board adopted a resolution directing the President and Secretary to prepare a report and transmit it to the Common Council, together with the resolution adopting the route and general plan, preparatory to the asking the consent of the municipal authorities to the construction of the road. Of the failure of the Board to include the extension of the road under Broadway south of Park row, Secretary Delafield said: "The Commissioners were unwilling to adopt a route running under this portion of Broadway unless there should be a substantial unanimity among property holders in favor of it. Only two property holders have expressed opposition so the construction of this portion of the road, but the Board is, nevertheless, unwilling to adopt this route unless evidence is submitted that a large proportion of the property holders desire it. If such evidence should be submitted within the next fortnight, it would probably be practicable to adopt this route. After that time it may be exceedingly difficult to do so."

The Conduit Electric Roads in New York.

President H. H. Vreeland, of the Metropolitan Traction Co., has made the following statement in regard to the changes of motive power on some of the horse-car lines in New York: "We have made the contract for the engines and the electrical machinery necessary to equip the Sixth, Eighth and Amsterdam avenue lines on the West Side and the Fourth and Madison avenue lines on the East Side, and also the Fifty-ninth street crosstown line. The street construction will begin as soon as the weather becomes sufficiently settled to make it practicable. Unless we meet with unforeseen hindrances, and if we have the reasonable co-operation of the public officials, we expect to have the lines in operation next fall. The property owners along the lines have given their consent to the change very freely. From all that we have been able to learn, this system has certainly given satisfaction to the residents along the Lenox avenue line, and we have remedied minor defects from time to time, until now we are satisfied that the large expenditure of money necessary to improve these longitudinal lines is fully warranted by the operation of our experimental line during the last 18 months. The machinery is now being built, and the work of track construction will be pushed with all possible vigor as soon as it can be begun."

The R. P. I. in Chicago.

The Alumni of the Rensselaer Polytechnic Institute held their 73d Annual Convention, Feb. 1, 2, 3, at Chicago, and were entertained by the Chicago members of the Alumni Association, numbering 75, and the Western Society of Engineers, Mr. Thomas T. Johnson having immediate charge of the visitors.

On the afternoon of Monday, Feb. 1, a trip of inspection of the Metropolitan Elevated was made and the power-house visited. The visitors were also shown the Van Buren street tunnel and the work of erecting the Union Loop structure. An excursion down the Drainage Canal, and in the afternoon, the launching of a large vessel at South Chicago, were the features of Tuesday. In the evening the alumni banquet was held at the Technical Club. Capt. R. W. Hunt was the toastmaster. W. I. Babcock responded to "Our Hosts of This Afternoon"; Maj. Jos. M. Knapp talked on "The Rensselaer Polytechnic Alumni"; the President, John Hudson Peck, responded to the toast, "The Institute." Other speakers were Gen. William Sooy Smith, William P. Mason, Jesse Lowe, Palmer C. Ricketts, O. F. Nichols, Moses P. Handy, G. A. Just, Isham J. Randolph and Thomas T. Johnston. On Wednesday the city watercribs were visited, and also the rolling lift bridges over the Chicago River. In the evening a small dinner was given at the Technical Club to prominent educators near Chicago, who afterward attended the meeting of the Western Society of Engineers. There were nearly 200 present at this meeting, which was held at the Technical Club. Mr. T. T Johnston, the President, opened the meeting and announced that the subject for discussion was "Technical Education." Mr. Isham J. Randolph made an address of welcome to the Alumni. The following made short speeches: John Hudson Peck, President Rensselaer Polytechnic Institute; Palmer C. Ricketts, Director Rensselaer Polytechnic Institute; Dr. Rogers, President Northwestern University; N. C Ricker, Dean of the School of Engineering, University of Illinois; Thomas C. Roney, Dean of the Faculty, Armour Institute; H. P. Judson, University of Chicago; T. N. Carmen, Director Lewis Institute; I. O. Baker, Professor Civil Engineering, University of Illinois; Rev. Dr. Snively, Troy, N. Y.; R. W. Hunt, Chicago.

No Bad Luck in This Number.

The press agent of the Baltimore & Ohio says that engine No. 1313, drawing Royal Blue Line train No. 511, on Jan. 24, ran from Baltimore to Washington, 41 miles, in 37 minutes. The train left Camden station at 4:02 and was in the Washington station at 4:39. He adds that the run from Branchville to Trinidad, a distance of 8½ miles, was made in 5 minutes. This is at the rate of 102 miles an hour, which is pretty good, even for a press agent.

Hidden in the Wilderness.

Attorneys for the Colorada Smelting Co. took out a writ of replevin yesterday on five carloads of ore, containing gold, silver and lead, valued at between $30,000 and $50,000, which was being shipped over the Rock Island road to be refined by the Pittsburgh Lead Co. The Pittsburgh company has gone into the hands of a receiver since the shipment was made, and was trying to secure possession of the metal. The cars were sidetracked at a place in Cook County known only to the parties interested, and it is believed the ore will be kept there until a settlement is made.—*Chicago Press Despatch.*

A Reading-Room for Employees.

The firm of Pratt & Letchworth, Buffalo, has lately opened a library and reading-room for its employees. The room, a large and pleasant one, is in a building adjoining the office of the company. The library contains over 1,000 volumes. The President of the Employees' Association is Mr. J. J. Richardson. At the opening of the room there was an address by Mr. O. P. Letchworth.

Government by the Irresponsible.

The Senate Committee on Interstate Commerce is said to have agreed that it will be impossible to pass the anti-scalping bill at this session, and that any report on it would be useless. Mr. Candler declared that the railroads had openly and on every possible occasion violated the provisions of the Interstate Commerce law by the formation of trusts, and that he did not propose to give them an opportunity to prevent the public from getting the benefit of cut rates whenever they could. Messrs. Gorman and Chilton called attention to the conduct of the railroads in the recent election, and asserted that they had been guilty of coercion and intimidation, and intimated that the time was most inopportune for the railroads to come to Congress and ask favors.

In the executive debate on the arbitration treaty, Senator Morgan is supposed to have occupied about two days, and it is believed that it is the intention to prolong the debate until the treaty has to make way for appropriation bills and other necessary legislation.

The reader will observe that not one of the gentlemen mentioned in the foregoing has sufficient stability of character to justify putting him in a position of trust in private business affairs, and we suggest that their power for evil in the Senate is a good illustration of the present miserable government by the irresponsible.

The Ore Docks on the Great Lakes.

The accompanying table, summarizing in a convenient form a number of interesting points in regard to the size and capacity of the ore docks on the Great Lakes, owned by the railroad companies, has been compiled by Mr. Hiram J. Slifer, Division Engineer, Ashland Division, Chicago & Northwestern.

RECORD OF ORE DOCKS ON THE GREAT LAKES.

Railroad.	Location	Dock No.	No. of pockets.	Storage capacity tons.	Height, water to center hinge hole.		Height, water to deck of dock.		Width of dock.		Length of spouts.	
					Ft.	In.	Ft.	In.	Ft.	In.	Ft.	In.
Chicago & North-western *	Ashland, Wis	1	234	36,036	32	10	54	0	46	8	27	0
		2	234	24,156	23	10	45	0	46	0	27	0
	Escanaba, Mich	1	184	24,104	28	10	48	6	37	0	21	0
		2	192	20,928	24	1	40	3	37	0	21	0
		3	226	30,284	31	2	52	8	37	0	27	0
		4	250	32,750	28	10	48	6	37	0	21	0
		5	232	43,152	28	6	53	3	37	0	21	8
Duluth & Iron Range	Two Harbors, Minn	1	141	18,000	26	10	45	6	41	0	23	0
		2	176	23,900	27	9	46	6	41	0	23	0
		3	90	16,100	28	10	51	6	49	0	23	0
		4	168	30,000	28	10	51	6	49	0	23	0
		5	168	33,600	30	0	54	0	49	0	25	0
Duluth, Missabe & Northern	Duluth, Minn	1	384	57,600	30	0	53	0	52	0	27	9
		2	192	34,560	32	0	57	6	52	0	27	9
Duluth, South Shore & Atlantic	Marquette, Mich	1	270	27,000	25	0	45	0	40	0		
		3	213	12,780	23	0	37	0	53	6		
		4	200	22,000	27	9	47	3	36	8	21	1
Duluth, Superior & Western	Allouez Bay, Superior, Wis	1	100	15,000	29	9	52	0	49	8	26	0
			†150	25,500	33	0	57	0	49	8	27	3
Lake Superior & Ishpeming	Marquette, Mich	1	200	36,000	30	9	54	0	52	0	24	7
Minneapolis, St. Paul & S. Ste. Marie	Gladstone, Mich	1	120	15,000	26	8	47	0	37	0	21	8
Wisconsin Central Lines	Ashland, Wis	1	314	33,560	31	4	54	6	36	0	27	0

* The length of the Chicago & Northwestern docks at Ashland are each 1,404 ft. The docks at Escanaba are 1,104 ft., 1,152 ft. 1,356 ft., 1,500 ft. and 1,392 ft. respectively. † New extension.

Brazilian Government Railroads to be Leased.

By authority of legislative enactment the government railroads of Brazil are now open to lease, collectively or separately, by private parties. Tenders will be received until May 15 by General Director Joaquim Maria Machado de Assio, at the General Traffic Department of the Ministry of Industry, Traffic and Public Works and at the Brazilian Legations in Paris, London, Berlin, Brussels and Washington. The lease must extend 60 years, but the government reserves the right to annul the same after the first 30 years. The government may temporarily take possession of the lines and rolling stock for military operations. In case of cancelment for a consideration, the value of same shall be paid in gold and determined by the average net receipts for the last five years. The terms of the lease, briefly stated, are: Five million pounds sterling to be paid at time of signing contract; a stipulated annual payment in gold, and 20 per cent. of the receipts in excess of an annual dividend of 12 per cent.

In advertising for bids the Director gives in detail a number of other stipulations to be included in the lease; among others a deposit of £50,000 is required as a guarantee for signing contract within 30 days after receiving notice of successful bid; entire property to be delivered to government at end of lease "in perfect state of preservation." The railroads leased shall enjoy the benefit of expropriation and of exemption from duties on material imported for use on same. The government reserves the right to impose fines, and rescission for delays in payments and irregularities of traffic. The railroads to which the notice refers are: The Brazil Central, extending through the states of Rio de Janeiro, San Paulo and Minar Geraes, 1,217.095 km. (756 miles); the Baturite, in state of Ceara, 244.280 km. (152 miles); the Sobral, in same state, 216 280 km. (134 miles); the South, of Pernambuco, and a branch line in state of Pernambuco, 193.908 km. (121 miles); the Pernambuco Central, in same state, 161 km. (100 miles); the San Francisco, in state of Bahia, 152 km. (94 miles); the Paulo Alfonso, in state of Alagoas and Pernambuco, 116 km. (72 miles); and the Porto Alegre to Uruguayana Railroad and branches, in state of Rio Grande do Sul, 587 km. (365 miles).

Street Cars Operated by Current from the Electric Light Mains.

An Italian electrician in Rome has succeeded in taking a current from the ordinary lighting mains by an adjustable transformer or resistance, on the main circuits, and operating cars with it. The accumulators and regulators perform their duty well, and the plant at Rome has been so successful that the number of cars is now being increased from 12 to 80. With accumulators some automatic means of regulation is necessary, either varying the number of cells in the circuit or providing a varying pressure across the terminals of the battery by a booster, as it is done in America. The first method is used by Mengarini with considerable success, the cells being cut out automatically.—*Engineering Mechanics.*

The Central Dominion Railroad.

The "Ferrocarril Central Dominicano" has been completed this summer from Puerto Plata on the north coast into the interior, reaching Santiago, about 42 miles. The first section was built under the management of Hollanders, and extends from Puerto Plata through a rough country to the Bayabonico River, a distance of about 11 miles. A portion of this section is operated as a rack road with nine per cent. grades and 22 deg. curves as the maximum. The gage is 2½ ft. It took about three years building this first section, when the control was transferred to Americans, Smith M. Weed, of New York, being at the head of the company known as "The San Domingo Improvement Co.," with offices at 36 Wall street, New York City. This company completed the location and built the road to Santiago, a town of some size and importance, situated in one of the finest valleys on the island and about 32 miles from the terminus of the old section of road. In locating this second section it was not found necessary to continue the rack system and a three per cent. grade and 22 deg. curve was adopted as maximum (the chief engineer afterward used a 32-deg. curve as maximum, and a minimum tangent of less than 50 ft., no transition being used). An engineer who has been over the road states that one section of 10 to 12 miles, for amount of curvature, probably could not be exceeded by any railroad in the world. The first 15 miles of the second section is the heaviest work on the road, as it crosses the principal mountain range in the north of the island. From Puerto Plata to Santiago there are some 15 steel bridges, ranging from 50 ft. to 160 ft. in length; one steel viaduct over 100 ft. and one tunnel about 700 ft., driven through material that was not thought necessary to line. The contract was let to the Drake & Stratton Co., of New York. This firm completed about 15 miles of the second section. The Improvement Co. finished the last portion of the road with its own forces. E. J. Kelly, of the Drake & Stratton Co., had charge for the Drake & Stratton Co.; Edward Hall was General Manager and Chief Engineer for the Improvement Co.; Mr. J. W. Von Leer was principal Assistant Engineer through the location and until the heavy part of the construction was finished.

The bridging, machinery, rolling stock, etc., furnished by the Hollanders, came from Europe; that furnished by the Improvement Co. was bought in the United States except the rails. The Pencoyd Co. built the bridges.

Strengthening the Bosom.

The following is a copy of an application for a position as train baggageman, lately received by Superintendent Welles, of the Southern Railway, at Columbia, S. C. We understand that the author of the letter is about 20 years old. He is not a negro. In the absence of assistance from the dialect editors of the *Century Magazine* and the *Evening Post*, we are obliged to confess that some of the expressions in this letter are to us entirely meaningless. It looks as though the writer had received a part of his education in India. Until now the native station agents on the Indian railroads have held the first rank as sober distorters of the Queen's English:

Supt. of Southern Railway Co.

Honored Sir:—I hereby make application for an agency on this division or a cituation in the baggage department, for which I do qualify myself, to the glorious opportunity, that the tittle will be honor to my cause, and strengh to my bosom. I whitch I greatly relish, if available, to an extent of my ambition, as though I were awarded a great purse, at a great price. I keeply realize the pulses of the cituation and regard it, at this hour as a special privilege in the hands, of a govnor. I have no words to offer in the paragment, I therefore I feel my strenght and valor to the tittle.

Moreover, you should recognize me "as one fitted on your beak. With cheirs to the conclusion, I hope will meet approval.

LOCOMOTIVE BUILDING.

The Charleston & Western Carolina has placed an order with the Richmond Locomotive Works for building 10 locomotives, with an option for an additional number.

The order of the Texas Midland for three locomotives placed with the Schenectady Locomotive Works, as stated in our issue of Jan. 22, included one passenger, cylinders 17 in. × 24 in., and two freight cylinders 18 in. × 24 in. These are duplicates of engines heretofore furnished that road.

CAR BUILDING.

The Pullman Palace Car Co. is now building two passenger coaches for the Lehigh Valley to be used on the "Black Diamond Express."

The Milton Car Works (Murray, Dougal & Co., Ltd.), Milton, Pa., has received several small orders from individuals, aggregating 50 tank cars.

The Barney & Smith Car Co., Dayton, O., is busy working on a number of contracts recently received. In addition to several small orders and orders for street cars referred to elsewhere in this column, it is building three trains of vestibuled cars for the Kansas City, Pittsburgh & Gulf, one reclining chair car, one passenger coach and one baggage car to each train. The cars are all being equipped with Buhoup vestibules, Buhoup-Miller platforms and couplers, Westinghouse air-brakes,

Pintsch gas and the Safety Car-Heating and Lighting Co.'s steam-heat apparatus in connection with the Baker heater. It is also building for the same road 100 60,000-lbs. capacity box-cars, equipped with Tower couplers, Westinghouse air-brakes, Chicago Car Roofing Co.'s "Chicago" roof and McGuire grain doors.

The Myersville & Catoctin (electric) Railroad to be built between Myersville and Middleton, Md., five miles, will want one combination (summer and winter) car, equipped with two 50 H. P. motors and also several freight cars.

The Pullman Palace Car Co. has a contract to furnish the Chicago City Railway with 70 open street cars. Fifty of these are motor cars for the Indiana avenue line, each equipped with two 25-H. P. Westinghouse steel motors. The remaining 20 cars are trailers to be used on the Cottage Grove avenue line. All are 30-ft. cars.

The Barney & Smith Car Co., Dayton, O., is building 30 open summer cars for the Peoples' Electric Street Railroad of Dayton. The cars have transverse seats with reversible backs. There is an aisle through the center. The cars are like those used by other lines in that city. These shops are also building nine interurban coaches, for the Cincinnati & Miami Valley Electric road. These cars are vestibuled, 32 ft. long over the body, 40 ft. long over platforms with standard steam-car pattern hoods and body. The cars have reversible cross seats upholstered in rattan and contain a smoking-room, upholstered in leather. The bodies are mounted on Barney & Smith standard Class "F" interurban trucks, with 33-in. wheels, built for high speed.

BRIDGE BUILDING.

Beatrice, Neb.—It is stated that six iron or steel bridges from 60 ft. to 160 ft. long are contemplated. Willis Ball is City Engineer.

Bloomsburg, Pa.—The Court has dismissed the exceptions to the river bridge at Mifflinville and confirmed the recommendation of a bridge over Hemlock Creek near Buckhorn.

Brooklyn, N. Y.—A bill has been introduced in the Senate authorizing the Boards of Aldermen of Brooklyn and Long Island City to expend jointly $350,000 for a drawbridge over Newtown Creek.

Buffalo, N. Y.—The City Engineer has made a report on the cost and details of bridges over the Erie, at Ferry and Walnut avenues. It is estimated that suitable structures can be built of steel at $3,000 maximum, and $2,800 minimum, each.

Burlington, N. J.—The Standard Construction Co. has filed articles of incorporation in the Burlington County Clerk's office. Mr. M. B. Perkins, of Beverly, is at the head of the new concern. The object of the company is to build various plants which take in a pretty wide scope. It is believed that the company will take hold of the proposed bridge between Burlington and Bristol.

Cleveland, O.—Geo. P. Nichols & Bro., Chicago, are the contractors for the design and erection of the operating machinery for the draw span of the new swing bridge, over the Cuyahoga River, at Willow street, for which the King Bridge Co. has the contract for the bridge proper. The draw will be operated by electricity and the locking devices by compressed air.

Green Bay, Wis.—The new swing bridge over Fox River is to be worked by electricity, Geo. P. Nichols & Bro., Chicago, having the contract for the design and installation of the operating machinery.

Milwaukee, Wis.—The Wisconsin Bridge & Iron Co. was the lowest bidder for the building of two bridges in Lake Park, the foundations for which are already in place. The bid is $15,800.

Nassau, Ont.—The Central Bridge and Engineering Co., of Petersborough, Ont., has been awarded the contract for a swing-bridge over the Trent Valley canal at this place.

New York.—A bill has been passed by the State Senate providing for the erection of a temporary bridge over the Bronx River at Westchester avenue, in this city.

A bill authorizing the City to issue bonds to complete the Third avenue Harlem River bridge has been reported favorably. The bill provides for an increase in the appropriation for the bridge of $350,000, which is sufficient to build a direct approach from the south to accommodate the traffic of Third avenue.

A mass meeting of residents of Long Island City will be held in the Queens County Court House on Feb. 13 to discuss a plan for the building of a bridge, with a central pier on Blackwell's Island, and connecting Long Island City with this city. It is said that the promoters propose to introduce a bill in the legislature calling for the appointment of a commission to build the bridge, the expense to be met by the Greater New York.

Petewawa, Ont.—A new bridge across the Petewawa River will be built. The Ontario government will assist.

Reading, Pa.—The Board of Public Works has favorably considered the plans prepared by City Engineer Chamberlain, for the proposed bridge across the tracks of the Philadelphia and Reading at Spring street. The plans provide for a structure of iron and steel, at a cost not exceeding $50,000. The bridge will be 330 ft. long, with two spans crossing the railroad tracks at a height of 20 ft. It will be 42 ft. in width, provision being made for a 30-ft. driveway and 6-ft. walks on either side.

Rockingham, N. C.—The legislature has empowered the Commissioners of Richmond County to levy a special tax for the purpose of building several iron and steel bridges in the county, at a total cost of from $12,000 to $20,000. The Chairman of the Board of County Commissioners will have the matter in charge.

St. Henry des Tanneries, Que.—At the last meeting of the Council of St. Henri des Tanneries, a motion was passed to petition the government to build a bridge across the Lachine Canal at Ste. Elizabeth street.

St. Louis, Mo.—A bill has been passed which provides for a $151,000 bridge, extending on Clark avenue over the sheds of the Union Depot from Eighteenth to Twentieth streets: $150,000 to be contributed by the Union Depot and Terminal Railway Co., according to their agreement in consideration of the franchise granted them by the city, and the remaining $1,000 to be given by the city, which the ordinance appropriates and authorizes to be credited to the bridge fund as soon as the railroad people pay their portion.

Syracuse, N. Y.—A bill for the appropriation of $36,000 for a bridge over the Erie Canal at Salina street has been introduced in the leislature. The city and the state are to divide the expense equally.

Titusville, Pa.—The building of a new bridge of about 180 ft. span over Oil Creek is being considered.

Toronto, Ont.—The plans of the bridge which it is proposed to build over the Don River, on the line of Queen street, at a cost of $60,000, have been prepared by the City Engineer. The cost given includes that of a temporary pile structure for the accommodation of traffic while the bridge is under construction.

Washington, Pa.—The iron bridge at Houstonville has been washed away. Its loss was caused by broken ice forming a gorge.

Wilmington, Del.—Arrangeme ts are being made to build several bridges for the elimination of grade crossings. James Wilson is the City Engineer.

RAILROAD LAW—NOTES OF DECISIONS.

Injuries to Passengers, Employees and Strangers.

In Illinois the Appellate Court hold that giving a passenger an upper berth in a sleeping-car imposes upon the company the duty of providing reasonably safe means for him to get out of it.[1]

In California it is said that for one to attempt to board a street car, the speed of which has merely been slackened in response to his signal that he wished to get on, cannot, in the absence of exceptional circumstances, be declared negligence, as matter of law; and that though the attempt is to get on the front platform, especially where there is a rule of the road that persons smoking should ride thereon, and the person attempting to get on is smoking at the time.[2]

In the Federal Court in an action against a sleeping-car company for failure to discharge its duty to provide a properly warmed and comfortable car for its passengers, it was held that damages alleged to have been caused by such failure, and consisting in suffering from the low temperature, contraction of a violent cold, and resulting in permanent injury to the passenger's eyes, are not so remote as not to be recoverable.[3]

In New Jersey the plaintiff, being the only passenger in a street car, became suddenly ill, told the conductor she felt sick, and twice requested him to stop the car so that she might get off. He failed to do so, and, going to the front of the car, began talking to the motorman. The plaintiff, growing worse, and becoming frightened and dazed, rose to her feet, and staggered towards the rear of the car, and there fell, unconscious, through the door. The Court of Errors and Appeals holds that whether the conductor was guilty of negligence was a question for the jury.[4]

In Illinois it is held by the Appellate Court that a master is not bound to supply the newest pattern or invention in machinery for the use of his servants. He may furnish such as are ordinarily sufficient for the purpose used, and such as with reasonable care can be used without more danger than is ordinarily incident in the business to those engaged therein.[5]

In Kentucky a freight conductor, though required to examine the condition of a train before taking charge of it, was not guilty of contributory negligence in failing to discover that a bolt which held the round of a car ladder was so rusted and worn that the top would slip off when he grasped the round.[6]

In Pennsylvania a carrier, under contract to deliver cars of iron to a furnace company, employed the defendant railroad company to haul cars from its tracks to the tracks of the furnace company, where they were received by employees of the furnace company and allowed to run down to the stock-house of that company by gravity. Plaintiff, an employee of the furnace company, with others, uncoupled one of three cars so left by defendant to allow it to run down to the stock-house. It had moved but a short distance when the other two cars started of their own accord, the brakes being defective, and ran into the uncoupled car, crushing plaintiff's arm. The Common Pleas Court holds that there was no contractual relation between defendant and plaintiff, binding defendant to furnish plaintiff with safe appliances.[7]

In Kansas it is decided that where two men were removing the bottom out of the firebox of a locomotive, and ashes suddenly and unexpectedly fell into the eyes of one of them, which caused him to give an involuntary start and relax his hold of the grate, by reason of which the other was injured, the former was not guilty of negligence rendering the common master liable for the injuries.[8]

In a case in the Federal Court one R. was employed by the foreman in charge of the track hands on a railroad operated by a Receiver, and was taken, with other track hands, to a cut on the line of the road, and set to shoveling dirt on to a flat car. On the day before R. was employed and set to work the bank at the side of the cut had been undermined for two or three feet, and wedges had been driven into the earth at the top of the bank, in order to throw the earth down. The bank had been left in this condition overnight, during which rain had fallen. No notice was given to R. of the conditien of the bank, and it could not be discerned from the place where he was working. Shortly after R. began work the bank fell upon him and killed him. The Court rules that leaving the bank in such dangerous condition was negligence, for which the Receiver was liable.[9]

In Georgia a sectionman who, misconceiving the amount of physical strength to be exerted in lifting and carrying a crosstie, overstrains himself in lifting the tie, cannot recover of the master for the injuries, since the risk was assumed.[10]

In Illinois a railroad is not guilty of negligence, as a matter of law, in running different sections of a freight train five minutes apart.[11]

In Rhode Island a conductor who had been ordered to stop his train and let another train pass, went to the first car to warn passengers against crossing in front of the approaching train, and, when it had passed, signaled the engineer to start ahead, but, in stepping on the car, he was caught between it and a telegraph pole standing within 20 inches thereof. He had never been on the sidetrack before, did not know of the pole, and had only a short time in which to make connections. A finding that the conductor was not negligent would not be disturbed.[12]

In Connecticut an electrical street railroad and light company constructed its road in such a manner that the support and span wires, which passed over the trolley wire, might become dangerous by contact with the trolley wire, unless properly insulated. Plaintiff, a lineman of the company, received an electric shock from taking hold of a support wire, due to the fact that a span wire, which was not insulated, had come in contact with the trolley wire. The Supreme Court holds that a finding that the company was guilty of negligence rendering it liable for the injuries received by plaintiff was proper.[13]

In New York a railroad is not liable to a brakeman who was thrown from the top of a car by a wire which had been stretched over the track by a third person, and has sagged down in consequence of its fastenings having been loosened by a storm, where there was no evidence that the company consented that the wire should cross its track, or had any interest in or connection with the wire.[14]

In Kentucky a railroad is held liable to a freight conductor for injury received by falling from a car ladder in which there was a defect that the car inspector might have discovered by the exercise of proper care.[15]

In the Federal Court one H., an employee of a railroad company, was engaged with another workman in repairing a water pipe at a point between two tracks in the company's yard. The men were bailing water out of a hole dug to reach the pipe; H., standing on the edge of the hole, lifting up and emptying the pails of water. While in this position, a switch engine approached on one of the tracks. H. stepped to the opposite side of the hole, and stood near the other track, continuing his work. While he stood there a train came up on the latter track, without warning by bell or otherwise, struck H., and inflicted injuries from which he died. There was evidence that H. had looked up the track a few minutes before, and that the train was not then in sight. The Supreme Court holds that the question whether H. was guilty of contributory negligence was properly left to the jury, in an action by his administratrix against the railroad company.[16]

In Maryland it is held that a person who drives across a railroad track at a public crossing where the company's yard is located, and whose horse, frightened by the noise of steam escaping from a shifting engine standing near the highway, runs away, cannot recover from the railroad for injuries received in such accident, without showing that the amount of steam escaping or the noise made thereby was unusual or unnecessary.[17]

[1] P. P. C. Co. v. Fielding, 62 Ill. App., 577.
[2] Finkeldey v. Omnibus Cable Co., 45 Pac. Rep., 996.
[3] Hughes v. P. P. C. Co., 74 Fed. Rep., 499.
[4] McCann v. N. & S. O. Ry. Co., 34 Atl., 1052.
[5] C. G. W. v. Armstrong, 62 Ill. App., 228.
[6] C. v. Hilliard (Ky.), 37 S. W., 75.
[7] Anderson v. Pitt. & L. E., 5 Pa. Dist. R., 400.
[8] U. P. v. Mahaffy (Kan. App.) 46, P. 187.
[9] Thomas v. Ross, 75 Fed. Rep., 552.
[10] Worlds v. G., 25 S. E. Rep., 646.
[11] T. H. & I. v. Leeper, 60 Ill. App., 194.
[12] Crandall v. N. Y., N. H. & H., 35 Atl. Rep., 307.
[13] McAdam v. Cent. Ry. & E. Co., 35 Atl. Rep., 341.
[14] Richmond v. N. Y. C. & H. R., 40 N. Y. S., 812.
[15] I. C. v. Hilliard, 37 S. W. Rep., 75.
[16] N. C. v. Herchiskel, 74 Fed. Rep., 460.
[17] P., W. & B. v. Burkhardt, 34 Atl. Rep., 1010.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, quarterly, 2 per cent. on common and preferred stock, payable March 1.

Cleveland & Pittsburgh, quarterly, 1¾ per cent. on guaranteed stock, payable March 1.

Connecticut & Passumpsic Rivers, 2½ per cent. on preferred stock, payable Feb. 1.

North Pennsylvania, quarterly, 2 per cent., payable Feb. 25.

St. Paul & Duluth, 2½ per cent. on preferred stock, payable March 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Missouri Pacific, annual, St. Louis, Mo., March 9.

Norfolk & Southern, annual, Norfolk, Va., March 4.

Pennsylvania & Northern, annual, Betz Building, Philadelphia, Feb. 17.

St Louis, Iron Mountain & Southern, annual, St. Louis, Mo., March 9.

Tennessee Coal, Iron & Railroad Co., annual, Tracy City, Tenn., March 9.

Texas & Pacific, annual, 195 Broadway, New York, March 17

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *International Association of Car Accountants* will hold a convention at New Orleans, La., on Feb. 23, 1897.

The principal papers to be read are:

Defects in the Car Service Department—W. C. Keeler, C. C. & S.

Efficient Organization of Yards—T. J. Purcell, R. W. & O.

Holding the Baby, or How to Raise Your Car Accountants—C. Brooks, M. & St. L.

Light Weighing and Stenciling Freight Cars—T. S. Bell, P. R. R.

The Private Companies—H. F. Vogel, St. Louis Refrigerator Co.

Car Tracers - H. G. Sleight, Vandalia.

Mileage on Cars Handled by Car Ferries—Thomas R. Limer, C. H. V. & T.

The *Street Railway Accountants' Association* will meet to organize in Cleveland, O., March 23 and 24, 1897.

The *American Railway Association* will hold its convention at Richmond, Va., on April 7, 1897.

The *National Convention of Railroad Commissioners* will be held at St. Louis, Mo., on May 11, 1897.

The *International Association of Ticket Agents* will hold a convention at San Antonio, Tex., on March 10, 1897.

The *Association of American Railway Accounting Officers* will hold a convention at Richmond, Va., on May 26, 1897.

The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Train Despatchers' Association of America* will hold a convention at Detroit, Mich., on June 22, 1897.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p m.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1739 Monadnock Block, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building Roanoke, at 8 p. m.

Canadian Society of Civil Engineers.

An ordinary meeting was held at society's rooms at 8 p. m., Thursday, Feb. 11, 1897. Abstracts of the following articles were read by members of the Committee: Relative Tests of Cast Iron and Strength of Cast Iron; The New Water Scoop of the Pennsylvania Railroad; A Water-Power and Compressed-Air Transmission Plant for the North Star Mining Co., Grass Valley Cal.; Foundations of Tall Buildings; Solar Work in Surveying; Through the Barren Lands. The discussion was on Mr. Atkinson's paper on "A New and Cheap Method of Dressing Car Wheels, Axles, etc., etc."

Street Railway Accountants' Association.

A convention of street railway accountants will meet at the Hollenden Hotel, Cleveland, O., on Tuesday and Wednesday, March 23 and 24, 1897, for the purpose of organizing a street railroad accountants' association. The call has been made by the secretaries, accountants and auditors of representative street railroads in the United States and Canada. Many of the officers of the larger roads have expressed their sympathy with the movement and signified their desire to aid in the formation of the organization, which will probably be known as the "Street Railway Accountants' Association." The main purpose of the organization will be to discuss the best methods of obtaining a standard system of accounts for all street railroads in the United States and Canada.

Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held at the society room Feb. 1, 1897, 16 members and 7 visitors in attendance. President-elect Hilgard called the meeting to order at 8:15, and inaugurated himself by a few advisory remarks.

The committee on licensing land measurers reported a bill and was instructed to refer the same to the Ramsey County delegation. The society declared itself favorably inclined to such a bill as a step in the right direction.

IMPROVED ROAD LAWS.

The matter of improved road laws was introduced by Professor Hayes, of the State Agricultural Experimental Station, and Mr. Choate, a Minneapolis attorney, who has given the subject much study for the past five years. Both were agreed on a conservative policy, inasmuch as the farmers generally seemed opposed to much outlay in this direction, as the cost must fall principally on them and the benefits largely accrue to engineers and bicyclists. Mr. Choate pronounced the present state road laws a hodge-podge of inharmonious acts, with which few of the present legislators were conversant. He advocated immediate steps toward an amendment to the state constitution, which should provide for a road fund and formulate the system of road improvement. A fund is a prime necessity, inasmuch as the only available fund at present is the Internal Improvement Fund, raised from the sale of lands donated to the state by the United States, and which, though now at a maximum, does not realize more than $25,000 per year. This fund is at present disbursed where it will cut the greatest dash politically. Mr. Choate's amendment proposes a fund which shall be pro-rated similarly to the State School Fund, and he assumes that it may be supplied by an inheritance tax, and by collecting the taxes which telephone, express, sleeping-car and other companies ought to pay. Two years must pass before such an amendment, if now introduced, could be approved by the people. In the meantime he advises the appointment of a temporary Highway Commission, whose duty it shall be to study the existing systems in other states, to examine road material in various parts of the state, to inquire into methods of construction, to consider the matter of convict labor in connection with road building, and, in fact, to educate themselves thoroughly with a view to offering practical suggestions for the disposal of the fund when it shall become available. Meanwhile the State Road Organization, the Farmers' Institute, and State School of Agriculture will be educating the people on the same subject. County Surveyor Forbes submitted a list of photographs showing the contrast between road improvements in Dakota County made by statutory labor and those performed under contract for the same cost. The difference was striking and much in favor of the contract system. President Hilgard appointed the following standing committees: Highways, J. D. Estabrook, C. F. Loweth and Geo. L. Wilson; Railroads, W. L. Darling and E. E. Woodman; Street Railways, Oliver Crosby and H. E. Stevens; Examining Board, C. L. Annan, H. E. Stevens and Archibald Johnson.

PERSONAL.

—Mr. E. V. R. Thayer has been elected Vice-President of the Chicago & West Michigan.

—Mr. C. H. Morrill has been appointed Assistant General Freight Agent of the Missouri, Kansas & Texas.

—Major William F. Shellman, Traffic Manager of the Central of Georgia, died recently at his home in Savannah, Ga.

—Mr. John J. Collier has been elected Secretary and Treasurer of the Northern Alabama, with office in Philadelphia.

—Mr. Frank S. Chandler, General Purchasing Agent of the Ann Arbor, has resigned, his resignation to take effect on Feb. 15.

—Mr. Preston Thornton, of Lexington, Ky., has been appointed Traveling Freight Agent for the Louisville & Nashville in Louisville.

—Mr. Frederick Taylor, at one time President of the Burlington, Cedar Rapids & Northern, died at his home in New York, on Feb. 4.

—Mr. William Hamilton, Assistant General Freight Agent of the Western & Atlantic Railroad, died on Jan. 27, at his home in Atlanta, Ga.

—Mr. A. M. Simmons, Manager of the Cleveland Car Service Association, on April 1 will leave the position, which he has held for several years.

—Mr. Henry A. Gray, Secretary and Treasurer of the Illinois Steel Co., has been elected Comptroller of the Northern Pacific, to succeed John Scott.

—Mr. Thomas J. Laughlin, General Agent of the Wisconsin Central for Montana, Idaho and North Dakota, died at his home in Helena, Mont., on Jan. 24.

—Mr. R. B. Rossington, for a number of years Freight Agent of the Pennsylvania Co., at Fort Wayne, Ind., has resigned. He has been succeeded by F. E. Sawyer.

—Mr. E. B. Follett, Local Agent of the St. Paul & Duluth, at Duluth, Minn., for several years past, has resigned, and will enter the employ of the Northern Pacific at Superior.

—Mr. H. A. Dunn, Assistant Auditor of Disbursements of the Atchison, Topeka & Santa Fe, has resigned, to become Auditor of the Central of Georgia, with headquarters at Savannah, Ga.

—Mr. J. F. Edwards has been appointed Pacific Coast Agent of the St. Louis & San Francisco, with headquarters at Los Angeles. He will represent both the freight and passenger departments.

—Mr. J. A. Pannabaker, Chief Clerk in the transportation department of the Columbus, Sandusky & Hocking, has resigned to enter the service of William Thornburgh, Manager of the Shelby Steel Co.

—Mr. N. H. Brown, formerly Superintendent of Transportation of the Texas Central, has been appointed Superintendent of the Atlanta, Knoxville & Northern, with headquarters at Marietta, Ga.

—Mr. P. M. Seymour, formerly Traveling Freight Agent of the Chicago Great Western at Pittsburg, Pa., has been appointed Contracting Freight Agent of the Baltimore & Ohio, at Columbus, O.

—Hon. Simeon R. Billings, who has been Railroad Commissioner of Michigan for four years past, retired at the beginning of this year and the Governor has appointed in his place Mr. Sybrant Wesselius.

—Mr. T. J. English has been appointed Superintendent of the Cincinnati and Sandusky divisions of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Springfield, O., succeeding William Gibson.

—The Governor of Illinois has nominated for Railroad Commissioners Charles S. Rannells, Cicero J. Lindley and Joseph Bidwell. All these gentlemen are spoken of as well-known, politically, throughout the state.

—Mr. C. F. Quincy, Treasurer of the Q & C Co., was elected Vice-President of the National Association of Manufacturers at the Philadelphia meeting. He represents the state of Illinois in the list of Vice-Presidents.

—Chief Engineer William S. Smith, who has for three years past been stationed in Philadelphia as a member of the Naval Examining Board, engaged in the examination of engineers for promotion, died on Feb. 7 at his home in that city.

—Mr. John DeWitt has been made Traveling Passenger Agent for the Hannibal & St. Joseph, the St. Louis, Keokuk & Northwestern, the Kansas City, St. Joseph & Council Bluffs and the Chicago, Burlington & Kansas City railroads, with headquarters at St. Louis, Mo.

—Mr. J. F. Cherry, Government Contractor of the Republic of Colombia, S. A., for the building of the Cauca Railroad from Buenaventura to Cali, Department of Cauca, died suddenly aboard the Magdalena River steamer Miguel A. Caro, during the night of Jan. 10.

—Mr. C. F. Resseguie, formerly Superintendent of the Chicago division of the Atchison, Topeka & Santa Fe, and who recently became General Superintendent of the Gulf, Colorado & Santa Fe, has been presented with a service of silver, containing some 100 pieces. The gift was made by the employees of the Chicago division of the Atchison.

—Col. George W. Dunn was nominated on Feb. 4, by Governor Black, of New York, as Railroad Commissioner, to succeed Alfred C. Chapin, whose term of office expires on March 15. Ashley W. Cole, of Brooklyn, and Frank M. Baker, of Owego, were re-nominated. The nominations were referred to the Railroad Committee, but have not yet been confirmed.

—Mr. Andrew J. Fairbank died in his home in Baltimore, Md., on Feb. 1. Mr. Fairbank had been for about 50 years in the service of the Baltimore & Ohio, his last position being General Freight and Passenger Agent at Camden Station, from which he retired last August. At the time of his death he was Vice-President and one of the directors of the Union Stock Yards Co

—At the meeting of the Board of Directors of the Chesapeake & Delaware Canal, held at Philadelphia, Pa., Feb. 9, Mr. Charles Chauncey was elected to succeed Mr. Moncure Robinson, recently deceased. Mr. Chauncey is an active business man representing large interests in transportation matters, with broad views as to the economy of unrestricted interstate commerce.

—Capt. William H. Smith died in Easton, Pa., on Feb. 5. Captain Smith was in 1878 Principal Assistant Engineer under Col. William P. Craighill in making surveys of a ship canal across the Peninsula, connecting the waters of the Chesapeake and Delaware Bays. Later, he became connected with the Baltimore & Ohio Railroad, as engineer in charge of work between the Susquehanna River and the Schuylkill, with headquarters at Philadelphia. Captain Smith retired while in charge of this work.

—Mr. E. Carl Breithaupt, Consulting Electrical Engineer, and President of the Berlin & Waterloo Street Railway Company, Vice-President of the Canadian Electrical Association and Member of the American Institute of Electrical Engineers, died January 27, at Berlin, Ontario, of injuries received the evening before at an explosion at the gas plant of the light and power station of the Berlin Gas Company, of which he was Manager. Besides Mr. Breithaupt, the night engineer of the power plant was killed and an assistant injured, who is, however, recovering. Mr. Breithaupt was a graduate of Northwestern College, Naperville, Ill., and had taken a post-graduate course in electrical engineering at Johns Hopkins University. He was within a few weeks of 31 years of age.

ELECTIONS AND APPOINTMENTS.

Baltimore & Ohio.—The following appointments have recently taken effect: D. F. Maroney, Superintendent of Transportation, with office at Baltimore; J. N. Kolbaugh, Superintendent of Motive Power of lines east of the Ohio River, with office at Baltimore; E. W. Grieves, Superintendent of Car Department; E. H. Bancard, Purchasing Agent, with office at Baltimore; Andrew Stevenson, Division Freight Agent, with office at Baltimore; W. R. McIntosh, Division Freight Agent, with office at Cumberland, Md.; G. A. Cartwright, Division Freight Agent, with office at Columbus, O.; E. S. King, Commercial Freight Agent, with office at Baltimore; R. W. Moore, Division Master Mechanic, of the Pittsburgh Division, with headquarters at Pittsburgh.

Baltimore & Ohio Southwestern.—H. A. Treudley has been appointed General Agent of the Bureau of Development, with office at Cincinnati, O. N. G. Spangler has been appointed Division Freight Agent, with office at Vincennes Ind.; Joseph V. Cahell has been appointed Southern Freight Agent, with office at Memphis, Tenn.

Boston & Maine.—Frank Barr has been appointed Assistant General Manager, with office at Boston, Mass., to succeed George F. Evans. C. E. Lee has been appointed Superintendent of the Worcester, Nashua & Portland Division, with office at Nashua, N. H.

Central of Georgia.—C W. Haskins has been appointed Comptroller, with office at Savannah, Ga. Ziba Bennett has been appointed General Agent, with office at Augusta, Ga., and will represent both the freight and passenger departments.

Chicago, Peoria & St. Louis.—At the annual meeting of the directors, held at the Chicago office of the company Feb. 1, the following officers were re-elected for the ensuing year: F. W. Huidekoper, President; C. H. Bosworth, Vice-President and General Manager; Charles D. Moyer, Secretary and Treasurer; Cravath & Houston, Counsel; Bluford Wilson, General Solicitor.

Cincinnati, Jackson & Mackinaw.—O. W. Johnstone has been appointed General Agent at Toledo. S. E Kirk has been appointed Commercial Agent at Jackson, Mich.

Cleveland & Southwestern.—At a meeting held recently in Bucyrus, O., the Board of Directors was re-elected with but one exception. Col. Dudley Evans, of New York, was elected to fill a vacancy.

Columbus, Hocking Valley & Toledo.—Effective on Feb. 15, E. R. Davidson, Northern Passenger Agent, at Detroit, Mich., has been appointed District Passenger Agent at Toledo to succeed A. J. Richter, resigned. L. W. Landman, Southern Passenger Agent, has been appointed General Traveling Agent, Passenger Department, with headquarters at Columbus, O. The positions of Northern Passenger Agent and Southern Passenger Agent have been abolished.

Des Moines & St. Louis.—At a recent meeting of the stockholders of this road, which is a proprietary branch of the Wabash, directors were elected as follows: Thomas H. Hubbard, Edgar Welles, Ossean D. Ashley,

John C. Otterson, C. J. Lawrence, H. K. McHarg, W. H. Blodgett, J. Ramsey, Jr., and F. M. Hubbell.

Findlay, Fort Wayne & Western.—At the stockholders' annual meeting, held in Fort Wayne, Ind., on Feb. 2, the following Board of Directors was elected: John Jacob Astor, W. Seward Webb, H. B. Ely, Stevens Wood, of New York; C. M. Bissell, Fort Wayne; George Chapman, Findlay, O.; Wm. T. Raimey, Cleveland, O.

Grand Trunk.—W. R. Tiffin has been appointed Superintendent of the Northern Division, with office at Annandale, Ont., to succeed James Webster.

Great Northern.—The title of C. H. Cannon has been changed from Superintendent of Car Service to Car Accountant. J. I. Fogg has been appointed Traveling Passenger Agent, with office at Buffalo, N. Y. F. L. Loper hasb een appointed Traveling Agent, with office at Boston, Mass., succeeding J. I. Fogg, transferred. G. M. Brush has been appointed Traveling Freight Agent, with office at Duluth, Minn.

Houston, East & West Texas.—At a stockholders' meeting held recently in Honston, Tex., the following officers were elected: President, T. W. House; Vice-President & General Manager, M. G. Howe; Secretary & Treasurer, James A. Baker, Jr., all of Houston. Norman S. Meldrum has been appointed General Manager.

Indianapolis Belt & Union Stock Yards.—At the annual meeting, held in Indianapolis, on Feb. 3, officers were elected as follows: President, S. E. Rauh; Vice-President, Julius Hanson; Auditor, Henry Lane; Traffic Manager, H. G. Graybill

Kansas City, Memphis & Birmingham.—At the annual meeting of stockholders, held in Memphis, Tenn., on Feb. 3, the old Board of Directors was re-elected, excepting that Edward S. Washburn was eleeted to fill the vacancy caused by the death of G. H. Nettleton.

Massillon & Cleveland.—The annual meeting of the stockholders was held on Feb. 2, in Massillon, O., and the following Directors elected: John Sherman, M. A. Hanna, Henry Amy, Charles Lanier, L. B. Harrison, Henry C. Urner, W. C. Egleston, William F. Robb and Edwin L. Arnold.

Mexican Central.—J. F. Donohoe has been appointed Ticket, Freight and Passenger Agent, with office at Chicago. R. E. Comfort has been appointed Commercial Agent to succeed J. F. Donohoe, with office at El Paso, Tex.

Natchitoches & Red River Valley.—At a meeting of the stockholders, held on Feb. 2, Officers and Directors for the ensuing year were elected as follows: President, M. Caspari; Vice-President, W. J. Behan; Treasurer, B. Beer; Secretary and Auditor, A. K. Glover; Directors B. Beer, W. J. Behan, M. Caspari, L. Chopin; E. B. Kruttschnitt and Joseph Henry.

Philadelphia & Erie.—The annual meeting of stockholders was held on Feb. 8, and the following managers were elected: N. Parker Shortridge, John P. Green, Samuel Gustine Thompson, J. Bayard Henry, William L. Elkins, William J. Howard, Amos R. Little, W. H Barnes, John H. Catherwood and George Woods.

Philadelphia, Newtown & New York.—The officers of this company are as fol ows: President, James Boyd; Treasurer, W. A. Church; Superintendent, E. C. Tomlinson, all with offices at Philadelphia.

Pittsburgh, Bessemer & Lake Erie.—The following appointment have been recently made: W. K. Richards, General Freight Agent; W. G. Sargeant, General Passenger, Ticket and Purchasing Agent; Daniel Moore, Local Treasurer; F. E. House, Chief Engineer; G. W. Sykes, Engineer Maintenance of Way; E. B. Gilbert, Master Mechanic.

St. Louis, Cape Girardeau & Fort Smith.—E. W. Cover has been appointed Superintendent to succeed E. S. McCarty, resigned. Receiver Louis Houck, in addition to his other duties, will act as General Manager.

St. Louis, Kansas City & Colorado.—R. C. Reed having resigned as Auditor and Treasurer for the Receiver, the duties of Treasurer for the Receiver are now being performed by W. M. Mitchell, and Henry Morris has been appointed Auditor for the Receiver.

San Francisco & North Pacific.—H. C. Whiting has resigned as General Manager and has been appointed General Superintendent. The duties of General Manager have been added to those of the President. W. G. Corbaley, Superintendent, has resigned at the request of the directors, and that office has been abolished.

Sharpsville.—Receiver G. N. McIlvain has announced the following appointments: J. B. Washington, Treasurer; S. K. Harris, Auditor; T. W. Galleher, General Freight Agent.

Southern Pacific.—A. D. Shepard has been appointed Assistant General Passenger and Freight Agent, with office at Los Angeles, Cal., to succeed J. M. Crawley. C. C. Carey has been appointed Traveling and Passenger Agent of the Atlantic System, with office at Kansas City, Mo.

Stony Creek.—The officers of this company are as follows: James Boyd, President; Theodore Voorhees, First Vice-President; C. E. Henderson, Second Vice-President; W. A. Church, Treasurer; W. R. Taylor, Secretary; D. Jones, Comptroller, and E. C. Tomlinson, Superintendent.

Wheeling & Lake Erie.—J. H. Townsend, formerly Assistant General Freight Agent, has been appointed Assistant General Freight & Passenger Agent. His headquarters will be changed from Wheeling, W. Va., to Toledo, O. J. B. Lownsbury has been appointed General Agent, with headquarters in Toledo.

Wilmington Seacoast.—At the annual meeting of stockholders, held in Wilmington, N. C., on Feb. 2, directors were elected as follows: Geo. R. French, G. H. Smith, B. G. Worth, Geo. L. Morton, W. H. Chadbourn, Jas. H. Chadbourn, Jr., and Oscar Pearsall.

Wisconsin Central Lines.—Burton Johnson has been appointed General Freight Agent, with office at Milwaukee, Wis., and C. E. Wilson has been appointed Assistant General Freight Agent.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Augusta Terminal.—A petition has been filed asking for a charter for this company, permitting it to build about two miles of road in Augusta, Ga., in the interest of the Union Compress Co.'s proposed plant in that city. The route as proposed is from a point on the Charleston & Western Carolina Railroad, paralleling the Savannah River to Washington street, at the junction of the Southern and South Carolina & Georgia railroads. The petitioners are William J. Craig and others. The stock of the company will be $200,000, divided into shares of $100 each.

Cleveland & Eastern.—Articles of incorporation of this company were filed at Columbus, O., on Feb. 2. The incorporators are: Duane H. Tilden, George W. Lee, Charles E. Fish, George H. Hopper and Charles H. Taylor. The capital stock is $50,000. The road as proposed is to extend from Cleveland, O., east to East Orwell, Ashtabula County, on the Pittsburgh, Youngstown & Ashtabula road, about 45 miles.

Coro & La Vela.—This company was incorporated some months ago under the laws of the state of New Jersey to build and operate a line between the city of Coro and the port of La Vela, in the northwestern part of Venezuela, S. A., a distance of nine miles. Grading has already been completed, and we are informed by Gen. Jacob Baiz, President of the company, of 102 Front street, New York City, that track-laying is to begin at once, and that the road will be completed and ready for operation by May 1. The rails used have been rolled by the Carnegie Company, and all rolling stock will be imported from this country. The capital stock of the company is $500,000, fully paid up.

Four Mile.—A certificate of incorporation of this company has been filed with the Secretary of State of Colorado. It is proposed to build four miles of road in Garfield County, Col., to connect certain coal lands with the branch of the Colorado Midland running from Cardiff south to Spring Gulch. The capital stock of the company is $50,000 and the incorporators are: J. W. Cummings, D. W. Mansfield, J. A. Voorhees and S. H. Kingsley. Work is to begin at once, and it is expected to complete the road within the next six months. The company's office is in Glenwood Springs, Col.

Kansas City, Pittsburgh & Gulf.—Tracklaying on this road between Mena and Horatio, Ark., about 60 miles, is progressing rapidly. Rails have been laid for 25 miles south of Mena and for 10 miles north of Horatio. The ties for the balance are on the ground, and it is expected that the line will be finished between those points by April 1. J. H. McCarthy, the contractor states that 2,000 men are now at work.

Mexican Roads.—A party of English engineers is now in Mexico, making a reconnoissance of the proposed road from Topolobambo, on the west coast, north to Corralitos, where it is to connect with the road now building, from Ciudad Juarez, opposite El Paso, Tex. The party will take soundings of the harbor at Topolobambo, and will then proceed via the Fuente River to the town of the same name, thence to the junction of the River through the Chinapas. From that point they will examine a route proposed for a branch line to Batopilas and Urique. Returning to the river they will follow the Chinapas and Septentrion canons to Bocoyna. From that point an examination will be made of the proposed route for a branch line to the City of Chihuahua, on the Mexican Central. Returning they will retrace their journey to Bocoyna, taking up the main route and following it through to Corralitos via Guerrero and Galliane.

Monterey & Fresno.—It is reported that the bonds of this road have been placed with an Eastern syndicate and that construction work will begin about March 1. The company proposes to build a road from San Jose in Santa Clara County, Cal., southeast to San Juan, about 40 miles, where it will join a line to Hollister at present located; thence east through the Panoche Pass in the Coast Range Mountains to Fresno, a total distance of about 160 miles. The road will not pass through Monterey, as was at first proposed.

Muskogee, Oklahoma & Western.—The Act of Congress granting to this company the right to build and operate a road through Oklahoma and Indian Territories has become a law without the President's signature, the statutory 10 days having expired without his taking action. The road is projected from Enid, O. T., to Muskogee, I. T., passing through Perry, O. T., and Sapulpa, I. T., about 200 miles. The line lies along the south bank of the Arkansas River. The survey was completed early last year.

Pennsylvania.—Chief Engineer Brown and the officials of the city of Philadelphia have agreed upon all the details for the extensive track elevation of the Kensington Branch in Philadelphia, and it is announced that work will begin as soon as the weather will permit, probably about the middle of March. This work, which will cost probably over two million dollars, involves the elevation of two main tracks from the Kensington terminus, in the northeastern part of Philadelphia, northward to Frankford Junction, about three miles. For most of the distance the new line will rest upon earth embankments, but there will be a dozen or more bridges to cross streets and a short length of metal structure near the southern terminus. It is expected that 2,000 men can be employed simultaneously on the earthwork.

Peoria & St. Louis.—Contracts for the construction of this road will be let in the spring. The line has been located from Greene Valley in Illinois, due south through San Jose, New Holland and Middletown to Sherman, Ill., a total distance of about 40 miles. Springfield and Peoria, Ill., will be the terminals. L. H. Thomas, of Thomasville, Ill., is President of the company and E. F. Harper, of East St. Louis, is Chief Engineer.

Salt Lake & Los Angeles.—Reports have been circulated for some time past that this company, which now operates 15 miles of road from Salt Lake City to Saltair, Utah, proposes to extend its line about 200 miles to the southwest, to reach the Deep Creek mineral region. President George Q. Cannon has now invited bids for 100,000 ties, and rails for 40 miles of road have been contracted for. These will be used on the extension to Ophir, Utah. General Manager Clayton states that work will be begun in the spring, and expects that the entire extension will be finished and in operation in the summer of 1898. The Deep Creek region covers 18,000 square miles and is very rich in lead and silver ores, with some gold.

Salt Lake & Ogden.—General Manager Simon Bamberger, of this road, which now extends from Salt Lake City, Utah, north 17 miles to Farmington, a pleasure resort on the lake, states that during the coming summer the road will be extended north from Farmington, 20 miles to Ogden, and the present line changed so as to operate the entire road by electricity. It is intended to begin work May 1. Power will be rented.

San Francisco & San Joaquin Valley.—The road is soon to be extended from Fresno, Cal., its present southern terminus, south to Bakersfield, in Kern County. Surveys have been made, and except in one or two places, right of way has been obtained for the entire line. At a recent meeting of the directors, a resolution was passed, instructing that condemnation suits be instituted immediately, at Fresno, directed against owners of land lying south of that city, who have declined to give the road right of way. The distance from Fresno to Bakersfield is about 110 miles, and there are rumors that the line may be further extended to Mojave, 55 miles southeast of Bakersfield, to connect those with the Atchison, Topeka & Santa Fe. It is expected to begin construction work as soon as all right of way has been obtained, and the line will be pushed through rapidly.

Southern Pacific.—The company has notified the residents of Live Oak County, Tex., and other counties of that section, that it is willing to extend the line from Beeville to Oakville, about 25 miles west, if the citizens of the district through which the road will pass will donate a bonus of $3,000 per mile toward building the line. Local papers state that the amount will be raised.

South Vandalia & State Line.—This company was recently incorporated at Albany, N. Y., to operate a road four miles long from South Vandalia in Cattaraugus County, N. Y., to a point in the valley of Chipmunk Run. The company's capital is $40,000. The Directors are: Charles P. Collins, J. R. Leonard, J. H. Evans, J. D. Downing, W. M. Kincaid and W. E. Burdick, all of Bradford, Pa., and Wilson R. Page, W. A. Hardison and Fred L. Eaton, of Olean, N. Y. The principal office of the road will be in Olean.

Stone Mountain.—The North Carolina Legislature has granted a charter allowing the extension of this line through Ashe and Wantaga counties, N. C. It is stated that the capital stock has all been subscribed. Surveys have been made from Roaring River, Wilkes County, on the Northwestern North Carolina Road, north, 18 miles, to Stone Mountain, and local papers report that work on this part of the road will begin shortly and be completed this year. This was the route specified and provided for in the original charter.

Tennessee Northern.—The road is now under construction from Caryville, Campbell County, Tenn., northeast 12 miles to Big Creek Gap, about 500 men being at work. It is proposed to extend the line north from Big Creek Gap, 18 miles to Jellico, Tenn., and from Jellico, east 24 miles to Middlesboro, Ky. An extension is also proposed from Caryville, southeast, about 35 miles, to Knoxville. A. A. Glasier, of Boston, Mass., is President of the company.

Winnipeg, Duluth & Hudson Bay.—T. L. Metcalf, of Winnipeg, on behalf of this company, is applying to the Dominion Parliament for a charter to build a railroad from a point in the southeastern part of Manitoba, on the Minnesota boundary line, between the eastern limit of Township Thirteen, east of the Principal Meridian, and the Lake of the Woods; thence northwest, to the city of Winnipeg; thence north to a point on the west side of Lake Winnipeg opposite Big Island; thence across to that island, passing over it and Black Island to the east side of the lake; thence by the most practicable route to deep water on Hudson Bay.

Electric Railroad Construction.

Braddock, Pa.—Town Council has passed the ordinance of the Braddock Electric Street Railway, which restores to the company its rights over streets of the borough subject to the ordinance of the Braddock & Homestead Co. We are informed that both companies will use the same streets and will pay into the borough treasury $5,000 each. The Braddock Electric Co. has had tracks laid for five years, but lost its franchise by a combination of misfortunes.

Brooklyn, N. Y.—The contract between the Long Island Electric Railroad and the Kings County Elevated Railroad to join in building an inclined plane connecting the two roads has been approved. The materials for the incline to be built on Liberty avenue, at the city line, have already been furnished by the Phœnix Bridge Co., and the work of putting the pillars and other iron work in position will now proceed rapidly. When this incline is finished the cars of the Long Island electric road will run from the surface up to the level of the Kings County road and there they will be attached to the trains and drawn through to the bridge; thus the passengers will not be required to change cars at the city line, as they do at present. The Kings County road will run express trains at certain periods of the day for the accomodation of the new line. The electric road from Fulton street, Brooklyn, to Jamaica, has been completed. The rails for the Hempstead extension have been laid nearly to Queens and the work of grading on the line of the Rockaway extension is being pushed as rapidly as possible. The line to Far Rockaway will be completed and in operation by July 1. The charter calls for a five-cent fare between Brooklyn and Jamaica. To other points the fare will be about 50 per cent. of the present steam railroad fares.

Cincinnati, O.—The Cincinnati & Miami Valley Traction Co. has awarded the contract for building four large Corliss engines, for use in the company's power houses, to the Hoover, Owens & Rentschler Co., of Hamilton, O.

The Cincinnati & Hamilton Electric Street Railway Co., of Cincinnati, has been incorporated with a capital of $10,000, by J. C. Hooven, M. C. Orton and others. The company has the right to build through Hamilton and Butler Counties.

Cleveland, O.—The Cleveland Electric Railway Co. has been incorporated, with a capital of $50,000, by D. H. Tilden, R. W. Lee and others. The proposed route is from Cleveland to Omell station on the Pittsburgh, Youngstown & Ashtabula Railroad.

Doylestown, Pa.—A charter has been granted to the Doylestown & Easton Street Railway Co., capital $100,000, to build a line three miles long from Doylestown to Danboro and Point Pleasant, over the Swamp Road and the Doylestown and Danborough Turnpike. The Directors include: Harry J. Shoemaker, Doylestown, President; Samuel A. Hellyer, M. H. Stout, and E. W. Keeler.

Highland Park, Ill.—The Highland Park Council has passed an ordinance granting a 21-year franchise to the Bluff City Electric Street Railway Co. to build an electric road on some of the principal streets in Highland Park.

New York.—Certificates of extensions of route have been filed by New York City street surface railroads with the Secretary of State as follows: Broadway & Seventh Avenue Railroad, extension in Broome street; Ninth Avenue Railroad, extension in 65th and 66th streets; Eighth Avenue Railroad, extension, in 145th street and in 65th and 66th streets; Sixth Avenue Railroad, extension in 145th street. The plans include a connecting line between the South street and Front street routes, through Wall street to the Wall Street Ferry.

Niagara Falls, South, Ont.—George Hanan and Edward Davis, of Niagara Falls, Ont., have secured control of the Niagara Falls, Clifton & Drummond Street Railway, and will convert it into an electric road in the spring.

North Brookfield, Mass.—There is talk in Brookfield and North Brookfield of an electric road to connect the Warren, Brookfield & Spencer electric line with North Brookfield, which lies about four miles north of this line. There is considerable discussion and apparently some strife as to whether the southern terminus of the new line shall be at Brookfield or East Brookfield. Charles Kimball, of the former place, is working to get a decision in favor of his village. The proposed line would parallel the North Brookfield branch of the Boston & Albany.

Oswego, N. Y.—S. M. Coon, attorney for the Knickerbocker Trust Co., of New York, which represents the first mortgage bondholders of the Oswego Street Railway Co., has begun foreclosure proceedings against the road and has filed the necessary complaint in County Clerk's office. The proceedings were begun by the Trust Co. at the request of the bondholders' committee, consisting of M. B. Richardson, S. M. Coon and C. S. Shepard.

Pittsburgh, Pa.—It is announced that the Second Avenue Traction Co. has secured the franchises of the Sewickley Valley Electric Passenger Railway Co. and will build the line to connect with the Pleasant Valley and North side controlled lines. The route of the pro posed line was given among our notes last week.

Reynoldsville, Pa.—There has been filed in the State Department of Pensylvania a joint agreement of consolidation to form the corporation to be known as the Reynoldsville & Falls Creek Railroad Co. Capital stock, $330,000. Lucius W. Robinson, Punxsutawney, Pa., is President. The road will eventually run from Reynoldsville to London Mines, a distance of 11 miles.

Springfield, Mass.—The Springfield *Republican* states that there is a "bright prospect" of an electric railroad from Warren, Mass., southward through Wales and Brimfield, Mass., to Stafford, Conn., about 20 miles. From Brimfield westward to Palmer, 8 miles, an electric line been talked of for some time, and a preliminary organization has been effected, but nothing has been done lately.

Waukegan, Ill.—The Bells City Electric Street Railway Co. has applied to the Supervisors of Lake County for a franchise. C. E. Loss is President.

West Newton, Pa.—A charter was granted on Feb. 1 to the West Newton Northern Street Railway Co. Among the incorporators are: W. W. Patterson, J. O. Tosh and H. M. Wright, Homestead; F. M. Null and T. E. Vankirk, West Newton; W. W. Dunn, McKeesport; Cyrus M. Suter, Sutervilie; H. N. Yont, J. R. Eisaman, Greensburg. The road will run from West Newton to Herminie, five miles, where it connects with the Hempfield branch of the Pennsylvania Railroad, forming a direct line to Greensburg.

Wilmington, Del.—The time for building the Chester & Wilmington Electric Railway has been extended until January, 1898.

Worcester, Mass.—The Worcester & Marlboro Street Railroad will run from Worcester through Shrewsbury, Westboro, Northboro and Hudson to Marlboro, some 20 miles, and it may be built by June 1. Franchises were obtained from the above places about five months ago. The General Electric Co. will furnish equipment at a cost of about $50,000.

GENERAL RAILROAD NEWS.

Baltimore & Ohio.—Suit has been begun in the United States Circuit Court at Baltimore against the Receivers of this road, by holders of $150,000 of the bonds of the Columbus & Cincinnati Midland to enforce the payment of the bonds. These bonds are guaranteed by the Central Ohio and by the Baltimore & Ohio railroads, as stated in our last issue, and the suit is a test case to define the status and obtain settlement for the total issue of bonds, which amounts to $2,000,000 and upon which the July and January coupons are in default.

Boston & Albany.—The company reports for the quarter ended Dec. 31:

	1896.	1895.	Inc. or Dec.
Gross earn	$2,324,796	$2,443,738	D. $118,942
Oper. expen	1,249,725	1,527,785	D. 278,060
Net earn	$1,075,071	$915,953	I. $159,118
Fixed charges	736,391	724,794	I. 11,597
Surplus	$338,680	$191,159	I. $147,521

The company reports cash on hand $783,105, and profit and loss surplus $204,836.

Boston, Revere Beach & Lynn.—The Boston News Bureau reports that the plan for the abolition of grade crossings in East Boston by relocation of tracks, which has been for a long time under consideration, has now been agreed to by the officers of this city, of the city of Boston, and of the Boston & Maine Railroad. Mayor Quincy has petitioned the legislature for a law authorizing the changes to be made. The plan contemplates the abolition of steam locomotives and the use of electric power on this road, and the sale of its ferry property to the city of Boston.

Buffalo, St. Mary's & Southwestern.—The St. Mary's & Southwestern, extending from St. Mary's, Pa., on the Pennsylvania Railroad, in a winding direction north to Shawmut, Pa., 26.1 miles, and the Buffalo & St. Mary's, from the latter point north to a connection with the Western New York & Pennsylvania at Clermont, 25 miles distant, have been consolidated under the above title. The roads were fully described in our issue of Oct. 16, 1896.

Camden & Burlington County.—At a special meeting of stockholders at Camden, N. J., Feb. 6, it was decided to issue $350,000 of bonds, at 4 per cent., in place of a smilar amount bearing interest at 6 per cent. The road extends from Camden to Pemberton, N. J., 22.5 miles, and Burlington to Mount Holly, 7.2, and is subleased to the Pennsylvania through the Camden & Amboy.

Central of Georgia.—The County Commissioners of Chatham County, Ga., have refused to allow the company to pay the principal (about $19,000) of the tolls due under the Glenn bill and be relieved of payment of about $4,300 interest. In making his application before the board President H. M. Comer stated that all of the municipalities along the line between Savannah and Macon had agreed to relieve the company from the payment of the interest, with the exception of Savannah, which would be applied to at once. Of the counties, he stated that he had not heard from Chatham, Effingham, Scriven and Burke. Jefferson and Bibb counties declined, Baldwin and Wilkinson counties accepted and Jones County agreed to remit one-half of the interest.

Central of New Jersey.—The report for the year ending Dec. 31, 1896, is:

Gross earn	$13,117,350	D. $450,673
Oper. exp. and taxes	8,318,568	I. 23,514
Net earn	$4,798,782	D. $474,187
Income from investments	1,268,560	
Total	$6,067,342	
Interest and rentals	4,671,077	
Surplus	$1,396,266	
Dividends, 5 per cent	1,124,850	
Profit and loss	$271,416	

Central Ohio.—The stockholders of the reorganized company have taken steps to protect their rights in the matter of securing payment of $75,000 due for rentals and receipts from the section of road operated by the Baltimore & Ohio, and an assessment of 50 cents a share has been levied to employ counsel. D. Fahnestock & Co., of Baltimore, have been named Treasurers of the Executive Committee, which consists of Joseph H. Rieman, William H. Conkling, Basil B. Gordon, Derick Fahnestock and John Black. The transaction was referred to in our issue of Jan. 8.

Chattanooga & Lookout Mountain.—It is stated that this road, known as the broad gage road, and extending from Chattanooga to the top of Lookout Mountain, Tenn., will probably be abandoned, as the present Lessee and General Manager, P. F. Jones, declines to renew his lease. The road cost $250,000, and is owned by Philadelphia capitalists.

Chicago & Southeastern (Indiana).—The employees of this road, through Lovett & Hathaway, of Anderson, Ind., have petitioned for the appointment of a Receiver, claiming that they have not received any wages for the past five months. The employees struck last week, and traffic was stopped.

Chicago, Burlington & Quincy.—The earnings for December and for the year ending Dec. 31 were:

December:	1896.	1895.	Inc. or Dec.
Gross earn	$2,955,053	$2,921,800	I. $33,253
Oper expen	2,484,207	2,520,707	D. 36,500
Net earn	$470 846	$401,093	I. $69,753
Year to Dec. 31.			
Gross earn	$34,176,456	$33,658,271	I. $518,185
Oper. expen	31,695,801	31,469,958	I. 225,843
Net earn	$2,480,655	$2,188,313	I. $292,342

Chicago, Hammond & Western.—A mortgage for $2,500,000, given by the Chicago, Hammond & Western Railroad to E. F. Hyde, Trustee for the Central Trust Co., of New York, was filed at Chicago, Feb. 3. The mortgage is given to secure an issue of 30-year gold bonds bearing 6 per cent. interest and maturing in 1927. The property covered by the mortgage comprises all property now and hereafter to be owned by the mortgagor, including 4,000 shares of stock of the Hammond & Blue Island Railroad. The instrument calls for the immediate delivery of $1,500,000 of the bonds; $500,000 of the bonds are to be used on the construction of a branch from La Grange to Franklin Park, and $150,000 on the retirement of equipment warrants which were used in paying for rolling stock. The balance of the issues may be used in constructing additional sidetracks and other improvements. A provision of the deed requires that the trustee shall always be Vice-President of the Central Trust Co.

Chicago, Peoria & St. Louis.—The gross earnings for the year ended Dec. 31, 1896, were $897,941 ($5,377.48 per mile); operating expenses, $625,185; net earnings, $272,756; less taxes and rentals, $72,703; net revenue, $200,053, or $1,197.92 per mile. This road (the Chicago, Peoria & St. Louis *Railroad*) is a reorganization of the Chicago, Peoria & St. Louis *Railway*, whose property was sold under foreclosure Sept. 21, 1895, and purchased for $2,100,000 by a reorganization committee, which organized the new company in January, 1896.

Denver & Rio Grande.—The operations for December and the first six months of the fiscal year follow:

December:	1896.	1895.	Decrease.
Gross earn	$567,565	$622,702	$55,137
Oper. expen	351,686	341,449	*9,237
Net earn	$215,879	$281,253	$65,374
Fixed charges	194,219	194,829	610
Surplus	$21,660	$86,424	$64,764
Six months:			
Gross earn	$3,769,459	$4,082,268	$312,809
Oper. expen	2,232,990	2,245,344	12,354
Net earn	$1,536,469	$1,836,924	$300,455
Fixed charges	1,176,037	1,179,071	3,034
Surplus	$360,432	$657,853	$297,421
Dividends	236,500	236,500	.....
Surplus	$123,932	$421,353	$297,421

*Increase.

Fitchburg.—The reports for the quarter and the half year ended Dec. 31 were:

Three months:	1896.	1895.	Inc. or Dec.
Gross earn	$1,925,256	$2,074,268	D. $149,012
Oper. expen	1,255,515	1,442,933	D. 188,418
Net earn	$669,741	$630,335	I. $39,406
Fixed charges	384,457	379,747	I. 4,710
Surplus	$285,284	$250,588	I. $34,696
Six Months:			
Gross earn	$3,816,800	$4,084,956	D. $268,156
Oper. expen	2,475,325	2,765,580	D. 290,255
Net earn	$1,341,475	$1,319,376	I. $22,099
Fixed charges	756,076	748,807	I. 7,269
Surplus	$585,399	$570,569	I. $14,830

Huntingdon & Broad Mountain.—The operations for the year ended Dec. 31 were:

	1896.	1895.	Decrease.
Gross earn	$583,362	$618,004	$61,642
Oper. expen	284,150	295,983	11,833
Net earn	$299,212	$352,021	$52,809

The total tonnage in 1896 was 2,614,417 tons, against 2,899,066 tons in 1895, a decrease of 284,649 tons. The number of tons of coal carried during the year was 2,169,636, against 2,413,820 tons in 1895, a decrease of 244,184 tons.

Evansville & Richmond.—The Sheriff's sale of the railroad to satisfy a judgment for $3,000,000, held by the Farmers' Loan & Trust Co., of New York, has been set for March 23. The road was chartered Sept. 10, 1888, to build a railroad from Elnora to Richmond, Ind., 175 miles, of which 101.4 miles between Elnora and Westport were built.

Middle Georgia & Atlantic.—In January of this year the Central of Georgia purchased a controlling interest in this road, which extends from Covington to Milledgeville, Ga., about 70 miles, but the terms were not made public. The officers of the Central of Georgia have been ordered to appear in court at Savannah Feb. 13 to show cause why a permanent injunction should not be granted against the conclusion of the sale. It now appears that Central of Georgia 5 per cent. bonds were to be given at the rate of $9,000 per mile for the Middle Georgia & Atlantic, the Central desiring the latter road in view of a possible contest with the Louisville & Nashville over the lease of the Georgia Railroad. Of the bonds given in purchase, $189,000 were to be retained by the Central for debts assumed, making $396,000 to be turned over. The opposition comes from the holders of bonds of the Eatonton Branch, whose bonds are guaranteed by the Middle Georgia & Atlantic, and was entirely unexpected. They claim that when the Central of Georgia bonds are delivered to the Middle Georgia & Atlantic stockholders there will be nothing left to give value to the guarantee of the Eatonton bonds.

Middle Tennessee & Alabama.—The State Trust Co. of New York has filed an ancillary original bill against the road, asking for the foreclosure of a deed of trust executed to the said trust company, securing bonds to the amount of $776,000. The road will be sold, and the company, with St. Louis capital, will be reorganized to complete the road. The company was organized in 1893 as a successor to the Decatur, Chesapeake & New Orleans, to construct a railroad from Shelbyville, Tenn., to Decatur, Ala., 78 miles. About 35 miles, from Boonville, Tenn., to the state line, has been built. A Receiver was appointed in November of last year.

Montauk Extension.—On Feb. 4 County Judge Benjamin H. Reeve, sitting at Riverhead, L. I., granted to Wyandanck Pharaoh, King and Chief of the Montauk Indians, right to bring suit against the railroad and others for the recovery of Montauk Point. The Indians, who are represented by Curtis & Scott, of New York, claim the original title to the lands, and any deeds which their forefathers may have given, it is contented by them, are of no effect, as their acts were never confirmed by the legislature. The suit involves title to about 9,000 acres. The value of the property is estimated at more than a million dollars. The road is leased to the Long Island.

Natchez, Red River & Texas.—The sale of this road, extending from Vidalia to Black River, La., 25 miles, has again been postponed, and the new date fixed as Feb. 15. The road has been advertised for sale for almost 2½ years.

New York, New Haven & Hartford.—The operations of the company for the quarter and six months ended Dec. 31 were:

Three months:	1896.	1895.	Inc. or Dec.
Gross earn	$7,384,677	$7,807,433	D. $422,756
Oper. expen	4,983,553	6,019,533	D. 1,035,980
Net earn	$2,401,124	$1,787,900	I. $613,224
Other income	190,498	170,987	I. 19,511
Total	$2,591,622	$1,958,887	I. $632,735
Fixed charges	1,579,672	1,845,877	D. 266,205
Surplus	$1,011,951	$113,010	I. $898,941
Six months:			
Gross earn	$15,277,609	$16,129,688	D. $852,079
Oper. expen	10,054,064	11,043,486	D. 989,422
Net earn	$5,223,545	$5,086,202	I. $137,343
Other income	300,523	234,532	I. 65,991
Total	$5,524,068	$5,320,734	I. $203,334
Fixed charges	3,143,342	3,419,211	D. 275,869
Surplus	$2,380,726	$1,901,523	I. $479,203

Norfolk & Western.—The operations of the company for the month of December and the three months ended Dec. 31, were:

December:	1896.	1895.	Inc. or Dec.
Gross earn	$984.021	$880,254	I. 103,767
Oper. expen. and taxes	669,294	676,266	D. 6,972
Net earn	$314,727	$203,988	I. $110,739
P. c. expen. and taxes to earn	68	77	
Three months:			
Gross earn	$2,789,975	$2,804,950	D. $14,975
Oper. expen. and taxes	2,017,628	2,167,374	D. 149,746
Net earn	$772,347	$637,576	I. $134,771
P. c. expen	72	77	

The average length of road operated was 1,570 miles. The reorganized company began operation Oct. 1, 1896. The entire present annual fixed charges, including interest on all undisturbed bonds of the old company, and outstanding car trust obligations, and on all the new bonds issued pursuant to the reorganization plan, are $2,263,194 yearly. The outstanding car trust obligations amount to $695,000. The company has no floating debt.

The company has decided, in order to save expense of foreclosure, to purchase the Clinch Valley Division 5 per cent. bonds and the Norfolk & Western adjustment mortgage loan. These will be paid with interest to June 1, 1897, by the Fidelity Insurance, Trust & Safe Deposit Co., of Philadelphia. The bonds outstanding amount to less than $10,000 of both issues.

North Carolina.—The proposition before the Legislature of North Carolina to annul the lease of the North Carolina Railroad Company to the Southern Railway is still pending, though it is expected that a vote will be taken within a few days. Excitement runs high at Raleigh, and the best judges are unable to predict the probable result of the vote. The Governor of the state has received from President Hoffman, of the Seaboard Air Line, a proposition to lease the North Carolina road from the state for 20 years at $400,000 a year. The Governor has reported this to the legislature, with a lot of correspondence between himself and Mr. Hoffman. The latter claims that he did not have a fair opportunity to bid for the lease of the road when it was taken by the Southern. The rental offered by Mr. Hoffman is considerably higher than that now paid by the Southern.

Northeastern of Georgia.—The litigation over the lease of this road has been abandoned, and arrangements will at once be completed to purchase it from the state. The road, which extends from Athens north to Lula, about 40 miles, was formerly operated by the Richmond & Danville, but was purchased in April, 1895, by the state,

which had endorsed the first mortgage bonds. In May, 1896, it was leased to E. Richards & Co. at an annual rental of $18,000. About six months later James P. Harrison, of Atlanta, instituted a suit claiming that Richards promised him a share of the profits from the operation of the road. This suit has now been discontinued. In December, 1896, a bill was introduced in the Georgia Legislature authorizing the sale of the road at an upset price of $287,000, the amount of the state bonds on the road.

Ohio Valley.—A committee, consisting of Richard L. Edwards, Frank Russak, Marcus Mayer, John B. Westbrook and Cord Myer, of New York City, has been formed to protect the interests of the holders of general consolidated and first mortgage gold bonds. The road is to be sold under foreclosure, at Louisville, Ky., June 1.

Oregon Railway & Navigation Co.—On Feb. 3 negotiations were completed whereby the foreign holders of preferred stock of the reorganized company, amounting in all to $3,000,000, sold the same at $45 per share to J. P. Morgan & Co., James J. Hill, President of the Great Northern Railroad, and Kuhn, Loeb & Co., who will act together in the interests of the Northern Pacific, the Great Northern, the Union Pacific and the Oregon Short Line & Utah Northern companies for a harmonious control of the Oregon Railway & Navigation Company. The same interests have also purchased other stock of this company and now hold control of the majority of $11,000,000 of the Oregon Railway & Navigation Company's preferred shares. The reorganized company has $24,000,000 of common stock and $11,000,000 of preferred. The reorganized Oregon Short Line & Utah Northern, which serves as a connecting link between the Union Pacific and the Oregon Railway and Navigation Company's lines, holds $16,000,000 of this amount-mostly common stock. The preferred stock was issued to represent assessments and in exchange for old bonds. The Oregon Short Line & Utah Northern paid nearly $1,000,000 cash, or $6 a share, assessment upon its holdings.

In the reorganization plan of the Oregon Railway & Navigation Co. it was provided that all shares of this company should be deposited with the Central Trust Co. in New York, who would vote for nine directors as nominated by preferred stockholders and for six directors as nominated by common stockholders. This arrangement is to continue for five years, when control will revert to shareholders. It is, however, provided that common stockholders may terminate the voting agreement at any time by securing to the preferred stock the full amount of five years' preference dividends. This can be done by deposit of cash.

Philadelphia & Reading.—The company reports for the month of December:

	1896.	1895.	Inc. or Dec.
Gross earn.	$1,777,445	$1,893,609	D. $116,163
Oper. expen.	922,806	1,058,026	D. 135,220
Net earn.	$854,639	$835,582	I. $19,057

The gross earnings of the Philadelphia & Reading Coal & Iron Co. for December, 1896, show a decrease of $445,659, and operating expenses a decrease of $495,343. The net earnings increased $49,685.

Port Royal & Augusta.—On Jan. 28 Judge Simonton, in the United States Circuit Court in Charleston, S. C., signed an order for the final discharge of the Receiver and directed that all the properties be turned over to the purchasers, Samuel Thomas and Thomas F. Ryan, of New York City. These gentlemen also own the Port Royal & Western Carolina, and this, with the Port Royal & Augusta, is now known as the Charleston & Western Carolina Railroad. The former extends from Augusta, Ga., north to Spartanburg, S. C., 133.1 miles, with branches from Laurens to Greenville, S. C., 36.3 miles, and from McCormick to Anderson, Ga., 57.8 miles, and the latter from Port Royal to Augusta, 112 miles.

Richmond, Nicholasville, Irvine & Beattyville.—There were no bidders at the sale of this road, Jan. 23, and it is now stated that an effort will be made to have the upset price reduced from $250,000 to $150,000.

St. Louis, Avoyelles & Southwestern.—Negotiations are being made to take the road out of the hands of the Receivers. The company was chartered in January, 1894, and the road was completed and opened for traffic between Bunkie and Simmesport, 26 miles, with a branch from Longbridge to Marksville, La., 10 miles, March 26, 1896. H. J. Fitch was appointed Receiver June 26, 1896. The appointment was later set aside, the contest finally resulting in the appointing of two Receivers, H. H. Youree, of Shreveport, La., being the other Receiver.

Seattle, Lake Shore & Eastern.—The United States Circuit Court of Appeals has affirmed the decree of foreclosure in the suit of the Union Trust Co., of New York, against the railroad. The appeal was taken by the Northern Pacific. The bondholders now have a clean title to their property. The road was sold under foreclosure at Seattle, Wash., May 10, 1896, and purchased by a Reorganization Committee for $1,000,000. Two corporations were afterward formed, one owning the property east and the other the property west of the Cascade Mountains.

Tennessee Central.—The date of sale of this road, referred to in our last issue, is announced as April 5. H. G. Dunbar, Clerk and Master in Chancery, Crossville, Tenn., will have charge of the sale.

Terre Haute & Logansport.—An order has been issued by the United States Circuit Court at Indianapolis directing the Receiver of the Terre Haute & Indianapolis Railroad Company, guarantor of the bonds of this road, to pay the coupon, due July 1, 1896, which was defaulted, with accrued interest.

Toledo, St. Louis & Kansas City.—A decision has been handed down by the United States Circuit Court of Appeals, sitting at Cincinnati, reversing the decision of the lower court, which denied to the preferred stockholders of the company the right of intervention in the action which they sought for the purpose of establishing their rights, and attacking the validity of the first mortgage bonds. The property has been in the hands of a receiver since May, 1893.

Vancouver, Klickitat & Yakima.—Judge Miller, of the Superior Court, at Vancouver, Wash., has appointed George W. Stapleton Receiver upon application of R. L. Durham, Trusee of the principal bondholders. The road was built by local capital 10 years ago, and extends about 15 miles into a timbered district, in the interior of the county. The original intention of the builders was to extend the road to Yakima, but was never carried out because of a lack of capital. The road has been operated ever since it was built, as a logging road. The estimated cost of the property is $160,000.

Wheeling & Lake Erie.—President Blair has recently issued a statement to the stockholders, in which he reviews the sale of $3,000,000 common stock for betterments, and the improvement of the property with the proceeds, but says that the road needs new sidings, heavier rails, new bridges, additional docks at Huron, etc. During the past year 1,000 new cars, 12 locomotives, 9 new steel bridges and 10 miles of sidings were built, and 1,000 tons of new rails laid. The common stock was not sold at less than the current market price. An agreement has been made with the Cleveland, Lorain & Wheeling for co-operation in carrying on the coal trade The Receivership was caused by decreased earnings, gross having decreased every week since last July, and net having fallen off very much more than the loss in gross. More than half the company's business is carrying soft coal, and the demoralization in rates and prices has never been greater. The next item in tonnage is iron ore, which has been very dull. The coal mines have been hampered by constant strikes. Bank failures in the Northwest, where much of the coal is marketed, retarded collections, and altogether the situation required the suspension of payment.

Wilmington & Weldon.—Negotiations have been completed in Baltimore for an issue of $938,000 general mortgage 4 per cent. bonds, the proceeds to be used to pay off at maturity, May 1, next, $936,000 of consolidated 7 per cent. bonds. The new bonds are a portion of a general first mortgage issue, of $4,000,000 of which $3,062,000 were issued in 1885 at 5 per cent. The saving in interest charges by the refunding operation will amount to $28,080 per annum.

Electric Railroad News.

Atlantic City, N. J.—Lawyer H. La Barre Jayne, representing stockholders and creditors of the Brigantine Transit Co., purchased the entire property of the company located in Atlantic City and at Brigantine for $50,000, subject to a mortgage of $15,500 held by local parties, at Receiver's sale on Feb. 4. It is announced that the purchasers intend to reorganize the company and make extensive improvements.

Baltimore, Md.—The Baltimore Traction Co. report as follows for the year ended Dec. 31:

	1896.	1895.	Inc
Gross earn.	$1,269,514	$1,179 191	$90,323
Oper. expen.	646,127	639,706	6,421
Net earn.	$623,387	$539,485	$83,902
Fixed charges.	445,511	413,097	32,413
Surplus	$177.876	$126,387	$51,488

At the close of the fiscal year there existed a floating debt of $278,785. To liquidate this indebtedness, which was incurred during that year by the construction of additional mileage and the purchase of new apparatus and for the further purpose of obtaining funds for double-tracking the suburban roads, the changing the motive power of the Druid Hill Avenue Line from cable to electricity, and the construction of the Short Line Railway, the company issued 800,000 covertible five per cent. gold bonds, as authorized by the stockholders at a special meeting held April 30, 1896. With the proceeds of these bonds all the outstanding obligations of the company were retired, all the new work and equipment paid for, and the company is now without any floating indebtedness.

Bowling Green, O.—The injunction has been dissolved against the Toledo, Bowling Green & Fremont Electric Railroad Co. in the matter of restraining the railroad from building an electric line through Bowling Green.

Brooklyn, N. Y.—The report of the Brooklyn Rapid Transit Co. for the quarter ending Dec. 31 is as follows:

Brooklyn Heights Railroad Company.

	1896.	1895.	Inc. or dec.
Gross earn. from operation	$1,063,171	$1,015,064	I. $48,107
Oper. expen. (exc. taxes)	632,798	638,199	D. 5,401
Net earn. from operation.	$430,373	$376,865	I. $53,508
Income from other sources.	59,614	54,443	I. 5,171
Gross income from all sources	$489,987	$431,308	I. $56,679
Fixed charges and taxes	481,486	529,911	D. 48,425
Surplus	$8,501	Def. $98,603	I. $107,104
Surplus for preceding quarter	71,745	49,986	I. 21,759
Surplus for six months ending Dec. 31	$80,246	Def. $48,617	I. $128,863
Oper. cost, exc. taxes	59.5%	69.2%	D. 3.4%
Oper. cost, inc. taxes	64.1%	2.69%	D. 5.1%

The apparent reduction of fixed charges and taxes over the same quarter for 1895 is caused by the fact that insurance on leased property and rentals for real estate and tracks are this year included in operating expenses, while last year they were included in fixed charges.

Brooklyn, Queens County & Suburban Railroad Co.

	1896.	1895.	Inc. or dec.
Gross earn. from operation.	$178,218	$159,209	I. $19,009
Oper. expen. (exc. taxes)	115,467	122,076	D. 6,609
Net earn. from operation.	$62,751	$37,133	I. $25,618
Income from other sources than operation	2,157	10,467	D. 8,310
Gross income from all sources	$64,908	$47,600	I. $17,308
Fixed charges and taxes	89,283	84,634	I. 4,649
Deficit	$24,375	$37,034	D. $12,659
Surplus for preceding quarter	1,891	Def. 362	I. 2,253
Deficit for 6 mos. ending Dec. 31	$22,484	$37,396	D. $14,912
Oper. cost, exc. taxes,	64.01%	76 67%	D. 12.66%
Oper. cost, inc. taxes	67.78%	79.08%	D. 11.30%

Chicago.—Charles T. Yerkes, President West and North Chicago Street Railroad companies, has closed a contract in New York for the sale of $3,500,000 of West Chicago Street Railroad consolidated bonds. He also gave an option to Eastern purchasers for $2,500,000 more of the entire issue of $10,000,000. The disposition of $3,500,000 will be sufficient to clear the large floating debt of the West Chicago Co. The proceeds of the other $2,500,000 will go toward the redemption of 6 per cent. debentures of the company. The remaining $4,000,000 of bonds will be held with the trustee for the retirement of a like amount of the first mortgage bonds of the West Chicago Street Railroad Co.

Dover, N. H.—The incorporators of the Union Street Railroad at Dover, N. H., have voted to change the name to the Union Electric Railroad. The following directors have been elected: Sumner Wallace, George E. Wallace, Albert Wallace, of Rochester; James E. Lothrop, Harrison Haley, of Dover. The Directors organized as follows: President, Sumner Wallace; Clerk, Leslie P. Snow, Rochester; Treasurer, Harry Hough, Dover.

Lincoln, Ill.—William H. Traner has been appointed Receiver of the Lincoln Electric Street Railway Company, which is bonded for $50,000 and controls six miles of track.

Paterson, N. J.—The Paterson Railway Co. report for 12 months ended December, 1896:

	1896.	1895.	Inc.
Gross earn.	$319,085	$298,688	$20,396
Oper. expen.	189,487	172,900	16,586
Net earn.	$129,597	$125,787	$3,800

TRAFFIC.

Traffic Notes.

A New Orleans paper reports that on Feb. 6 two trainloads of lard and provisions arrived in that city for export.

The Baltimore & Ohio, in expectation of a large traffic to Washington, March 4, is laying about 10 miles of additional sidetrack in that city.

The Attorney General of Texas, has entered suit against the Chicago, Rock Island & Pacific, for violating the cotton compress rules prescribed by the State Railroad Commissioners.

The railroads carrying grain from Kansas City and St. Louis to Savannah, Charleston, Mobile and other Southeastern ports, have made reductions of about five cents on export grain to meet the reductions made by the Illinois Central to New Orleans.

In a complaint against the Allegheny Valley, the Interstate Commerce Commission has decided that open-end envelopes, made from an inferior grade of paper, are nevertheless substantially the same as ordinary envelopes, from a traffic standpoint, and refuses to order them classified with paper bags.

The Chesapeake & Ohio now runs a passenger train through every other day between Washington, D. C., and Old Point Comfort, Va., 209 miles, in 5½ hours. The route of these train is via Quantico and Doswell, over the Pennsylvania and the Richmond, Fredericksburg & Potomac. They run south on Tuesdays, Thursdays and Saturdays, and north on Mondays, Wednesdays and Fridays.

The managers of the Joint Traffic Association have adopted a resolution allowing new freight cars to be hauled free, when loaded with freight in the direction in which the cars are consigned, the freight being billed at regular rates and no mileage being paid on the cars. So far as appears from the terms of the resolution, as published, a load of 100 lbs. would comply with the regulation.

Mr. Rice, President of the American Spirits Manufacturing Co., wants Congress to change the internal revenue law so that alcohol can be shipped in tank cars from the west to the Atlantic seaboard, thus enabling American distillers to sell alcohol in the European market. They are now unable to compete with European distillers, because under the revenue law all alcohol must be immediately put in barrels. A barrel costs more than one-third as much as the alcohol it contains.

Chicago Traffic Matters.

CHICAGO, Feb. 10, 1897.

A meeting of the executive officers of the Western Freight Association has been called for February 17. The present attitude of the Illinois Central road in the matter of export rates to New Orleans, and the Chicago Great Western road's action in meeting the Soo competition will be the principal subjects for discussion.

There has been much interest here in the final outcome of the anti-scalping measure now before Congress. Chairman B. D. Caldwell, who spent 10 days in Washington, reports a good fighting chance for the bill. He says that the bill has not been killed. The meeting of the Senate Committee held Monday was for the purpose of giving the scalpers a hearing. He says that no action was taken by the committee, but that the question is to be finally settled at an adjourned meeting to be held to-day. This offsets another attempt of the scalpers to make it appear that they have been victorious in defeating the measure.

Western roads are acting very cautiously in the matter of making reduced rates for the Corbett-Fitzsimmons prize-fight in Nevada. A request for such reduced rates has already been negatived by the Western Passenger Association, and no further action will be taken pending hearing from the Southern Pacific Company, which is really the controlling line. One of the Western roads, however, has given it out that if the rate of $62.50 from Chicago is not authorized by the association it will appeal, and make the rate by giving the regular 10 days' notice.

E. P. Ripley, President of the Santa Fe, has presented a memorial to the Kansas Legislature, setting forth reasons why it should refrain from further legislation hostile to the railroads. He shows in a striking manner that the interests of the state are bound up in the railroads of the state.

The cut in lumber rates in the Northwest, which threatened extensive disturbance, will be fixed up, and tariffs restored Feb. 16. The Chicago, St. Paul, Minneapolis & Omaha, which made the reduction general to meet the local reduction in rates at Eau Claire, which the Interstate Commerce Commission ordered the St. Paul to put in for the sake of equality with other Wisconsin points, has agreed to discontinue the rate on that date.

Eastbound shipments from Chicago and Chicago Junction points to and beyond the Western termini of the trunk lines for the week ending Feb. 4 amounted to 120,927 tons, as compared with 88,927 tons the preceding week. This statement includes shipments of 58,956 tons of grain, 13,951 tons of flour and 11,914 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING FEB. 4		WEEK ENDING JAN. 28.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio	5,520	4.6	6,226	5.9
C., C., C. & St. Louis	13,066	10.8	9,382	10.5
Erie	8,358	6.9	4,885	5.5
Grand Trunk	8,382	6.9	8,954	10.1
L. S. & M. S.	17,253	14.3	13,862	15.6
Michigan Central	13,793	11 4	9,522	10.7
N. Y., Chi. & St. L	8.777	7.3	7,248	8.1
Pitts., Cin., Chi. & St. Louis	14,419	11.9	7,334	8.2
Pitts., Ft. Wayne & Chicago	24,656	20.4	17,931	20.2
Wabash	6,703	5.5	4,583	5.2
Totals	120,927	100 0	88,927	100.0